IRON AGE

THE NATIONAL METALWORKING WEEKLY A Chilton Publication JUNE 30, 1960

★ Special Report to Management:

How to Get More From Metallic Coatings p. 137

Can Short-Run Automation Pay? p. 107

Startup Plans for '61 Cars p. 112

Digest of the Week p. 2-3

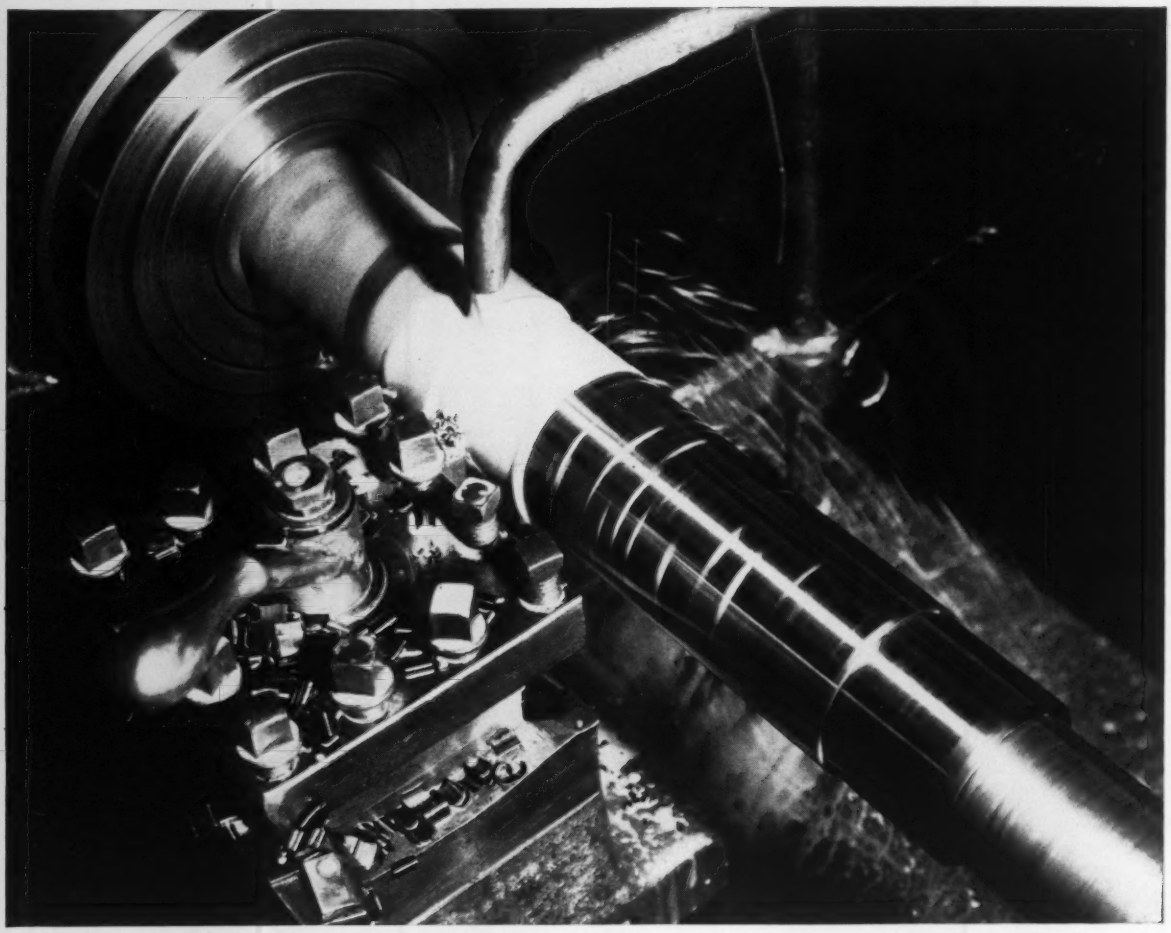


Photo courtesy Daffin Mfg. Co.

Aristoloy Leaded reduces cost 50% on drive shaft for Daffin Mfg.

Daffin engineers were skeptical when the Copperweld representative said Aristoloy Leaded* steel would reduce production costs of a 500 lb. drive shaft . . . but today savings are 50% greater compared with the steel formerly used.

Lower cost of material (an unleaded nickel alloy was formerly used), longer tool life and increased feed and speed are responsible for the savings.

The finished part reveals no detectable difference in physical properties.

And, since switching to Aristoloy, Daffin reports "uniformity of the steel has been much more consistent."

For complete information call the Copperweld representative in your nearest large city . . . or write today for New Products & Facilities Catalog.

* Inland Ledloy License

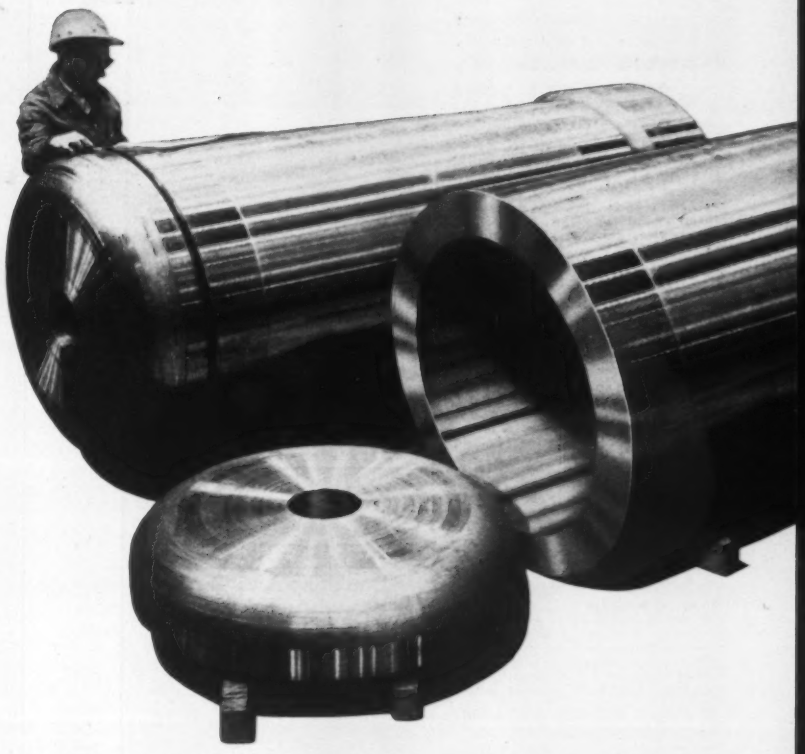
ARISTOLOY STEELS

DIVISION OF
COPPERWELD STEEL COMPANY

ARISTOLOY STEEL DIVISION • 4001 Mahoning Ave., Warren, Ohio • EXPORT: Copperweld Steel International Co., 225 Broadway, New York 7, N. Y.

"Will the weld be as strong as the cylinder?"

Marion Power Shovel asked this question when we recommended two-piece forgings (at considerable savings over the former one-piece forgings) for use as jack cylinders in their giant electric shovels. We answered "yes" . . . and tests show the weld metal has higher mechanical properties than the minimum physicals required for the cylinder.



BECAUSE THE HOLE *at the cylinder end is small, machining the sleeve before the head is welded on is lots easier and faster than machining the former one-piece forging. There's more room to work; the tool can get a good grip on the piece, hog out the metal, instead of pick it out. The savings are more than enough to offset the added welding cost.*

FOUR FORGED-AND-WELDED *"equalizing" cylinders, like those above, are used to keep the upper frame of this Type 5761 Electric Shovel level during operation. Made by Marion Power Shovel, Marion, Ohio, this shovel's dipper has a 65 cu yd capacity.*

Forged from manganese-vanadium steel, this sleeve-and-head cylinder weighs 22,690 lb.

The sleeve itself is 9 ft, 10 in. long, with a body OD of 45 in. Flange OD is 48 in.; flange ID, 35¼ in. The wall is 5-in. thick. To produce it, we upset, punch, hollow-forge, double-normalize and temper. Then we finish-machine to size, including the weld bevel on the end of the sleeve.

We forge the head as a disc of 49 in. diameter, and 11-in. long. Then we finish-machine it to size (45-in. OD, 9¾-in. long), including the weld bevel, and treat it the same as the sleeve.

The two pieces are then assembled and welded. The cylinder receives a stress-relief anneal after welding, and the weld is radiographed to assure soundness. Excess weld on the OD and ID is then machined off.

If you have a forgings problem, Bethlehem is a good company to get in touch with. We think as hard about one-pound drop forgings, as we do about 200-ton press forgings. To start us thinking about your forging, call the Bethlehem sales office nearest you.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
Export Distributor: Bethlehem Steel Export Corporation

Steel — For strength . . . economy . . . versatility

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The IRON AGE

June 30, 1960—Vol. 185, No. 26

Digest of the Week in

★Starred items are digested at right.

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A Nation Comes of Age, and Becomes Better for It 7

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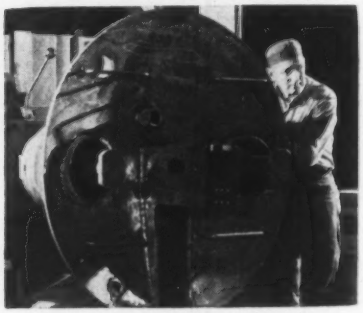
News of the Industry

JOB SHOP AUTOMATION

Try a New Concept—Low volume and product variety should



not stop you from considering automation. This new approach may show that it can be profitable and practical. P. 107

ALUMINUM EXPANSION

Growth Markets — Alcoa's new expansion of rolling facilities is aimed at new markets for aluminum sheets. One target is a big share of the market for metal cans. New mills will help cut costs. P. 110

KALDO STEELMAKING

First Big Test — This oxygen steelmaking process is getting its first big test at Sollac, France. And early results have proved very favorable. P. 111

'60 AUTO PRODUCTION

Early and Fast Start—The auto industry will start changeover shutdowns in a few weeks. Despite high

Metalworking

Cover Feature

METALLIC COATINGS— Sound selection of precoated metals puts Truelove & MacLean Inc. in business as a fabricator of these useful materials. Precoated stock comes in from Thomas Strip Div., Pittsburgh Steel Company. P. 137

inventories, new model output will be high. P. 112

MACHINE TOOL

More Safety Data? — Are machinery builders getting enough of the right kind of data to do a good job of building safety into their machines? P. 129

Engineering-Production Developments

HOW TO GET MORE FOR METALLIC COATINGS

Why They Pay Off—Precoated metals are on the move. Greater quantities are being used; variety of applications is increasing. Fabricators have good reasons to switch over to these metals. And they're fitting them right into production lines, too. It all leads to better product finishes. P. 138

Lots Available—Selection of a precoated metal is based on a number of factors, including design, environment and fabricability. But out of the large variety of available precoated metals, there's bound to be one to fill your needs. Select your surface finish and pattern with care. P. 141

How They're Formed—How do precoated metals take to the various forming operations? Are they in danger of losing or marring their finished surface? The answer: Standard techniques will do. Usually no more than ordinary care is needed to protect the finish during forming operations. P. 144

Joining Methods—The success of precoated metals is based, in large part, on their joinability. Since these materials are in the finished form, there are some exceptions to general practice. Some approaches, if followed, will make the job that much easier. But they do respond to welding. P. 148

Sound Buying—Getting the most for your money involves more than careful selection, forming and joining. Good purchasing practices also help to achieve that end. It depends on what you want. A heavy galvanized coating might cost a little more, but it offers far superior corrosion resistance. P. 152

Market and Price Trends

TARIFF BATTLE

Time to Speak Up—Industry has its chance to protest tariff reductions in GATT hearings. Past experience shows metalworking's record in stating its position is none too good. Here are some pointers to follow if your company wants to speak up. P. 114

AUTOMOTIVE

On the Downgrade — Producers of medium price car lines are getting ready to retaliate against the low price field for invading their markets. They will offer lower priced models in 1961. P. 121

STEEL SUMMARY

Outlook Gloomy — Unless big steel consumers reverse their direction, the autumn upturn in steel may be disappointing. Of the major consumers, only the auto industry is making plans for big orders of steel in the late summer and early fall. P. 189

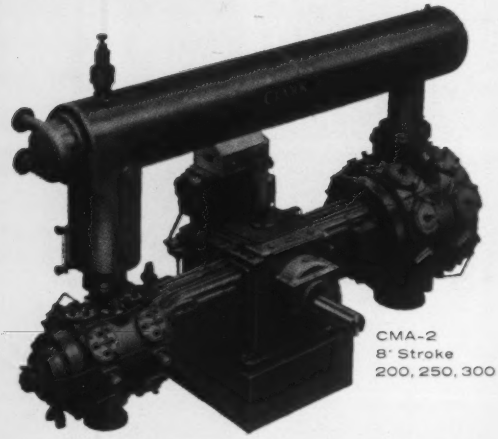
PURCHASING

Holding Steady—Motor makers say the market is holding steady. But there is not demand enough to tax capacity. Fractional motor makers face a critical year. P. 190

NEXT WEEK

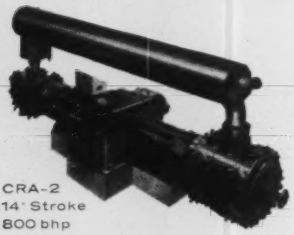
PATTERNS AND TRENDS

Labor Contracts—The pattern of labor settlements is important in planning your labor costs. Next week's Special Report analyzes labor patterns and trends in collective bargaining.

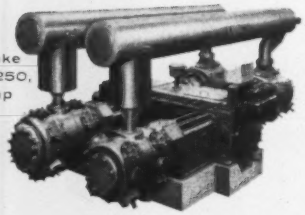


CMA-2
8" Stroke
200, 250, 300 bhp

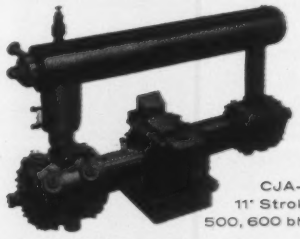
Whatever your requirements for industrial air,



CRA-2
14" Stroke
800 bhp

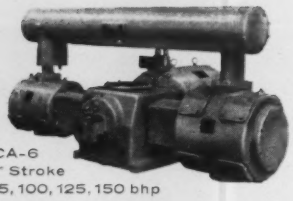


CRA-4
14" Stroke
1000, 1250,
1500 bhp

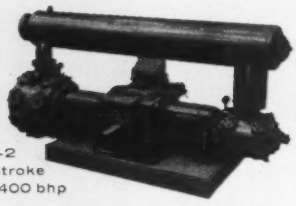


CJA-2
11" Stroke
500, 600 bhp

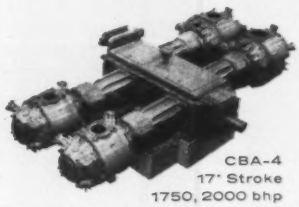
there's a Clark Balanced/Opposed Compressor



ICA-6
6" Stroke
75, 100, 125, 150 bhp



CMB-2
8⅜" Stroke
350, 400 bhp



CBA-4
17" Stroke
1750, 2000 bhp

to do it better & more economically in less space.

Six Stroke Sizes...23 Models. The Balanced/Opposed design is only one of many innovations that have made Clark air compressors the most dependable in industry today. Rugged and compact, they are specifically designed to handle your "100 lb." air requirements most economically. ■ Born of exhaustive research and proved by millions of hours of service, Clark Balanced/Opposed Industrial Air Compressors are engineered for maximum performance and reliability. They come equipped with "Simplaire" Valves—the simplest air compressor valves in the industry . . . easy to put together, easy to take apart, and *easy on your maintenance budget*. From a comprehensive line of 23 models, you can pick the compressor that's *right* for your needs. Sizes from 75 to 2000 horsepower; capacities range upward from 375 cfm. ■ For all the reasons why you'll be dollars ahead with Clark compressors, contact your Clark representative today, or write for Bulletin 185, **Clark Bros. Co., Olean, N.Y.**

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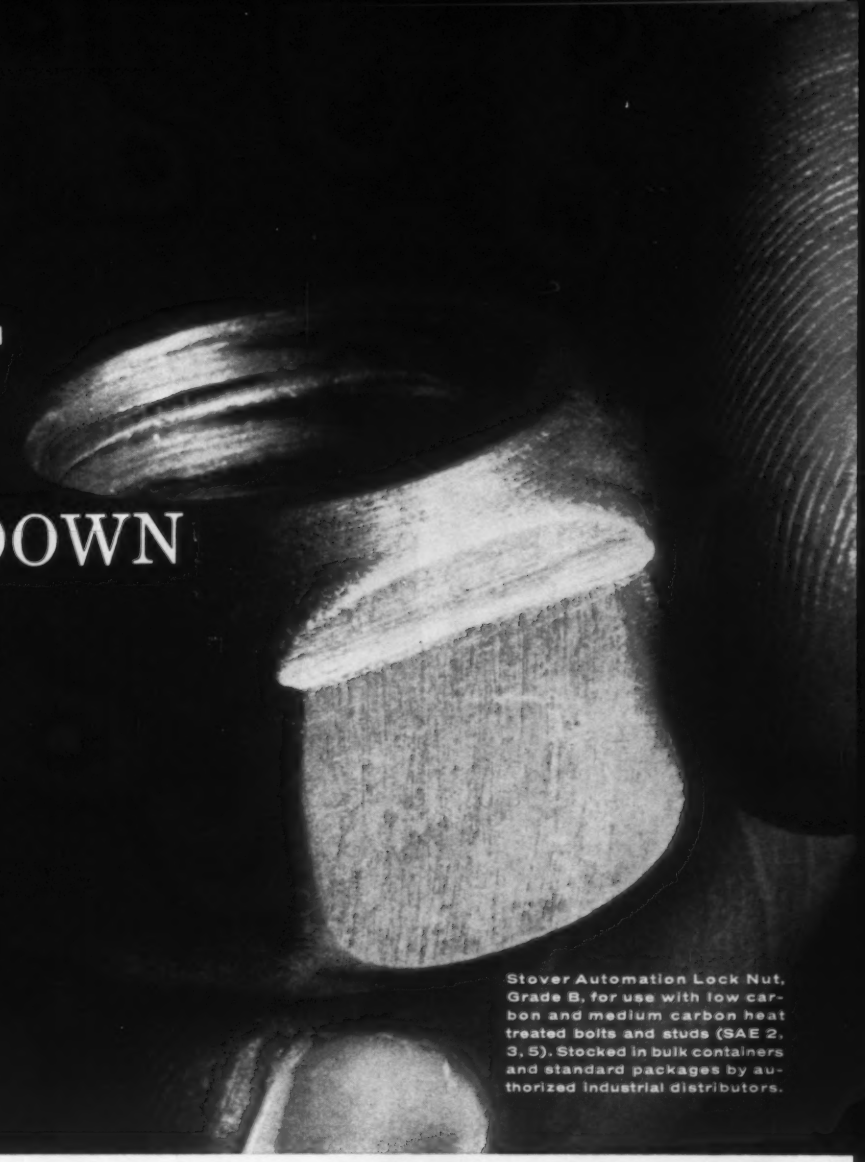
THE STOVER LOCK NUT FAMILY CLAMPS DOWN ON COSTS AT EVERY TURN



Stover Automation Lock Nut, Grade B, for use with low carbon and medium carbon heat treated bolts and studs (SAE 2, 3, 5). Stocked in bulk containers and standard packages by authorized industrial distributors.

Don't let the simple appearance fool you: Stover Lock Nuts take 25% less tightening torque to reach required clamping loads than common nuts or competitive lock nuts. This means you can use smaller, lighter driving tools. Yet Stover Lock Nuts won't back off by themselves—seated or unseated. Moreover, they start like common nuts, run up smoothly without galling or seizing, can be hand or hopper fed, and are fully reusable.

Car and tractor makers, for example, used about 80 million Stover Lock Nuts last year. The money these companies saved in *either* purchasing, assembly, or service-in-the-warranty-period easily paid for the lock nuts' initial cost. Value—in spades!

Stover Lock Nuts cost a little more than common nuts, but are very competitive with other lock nuts. They're available in bulk, with the popular styles also available through industrial distributors. Write us for the name of your nearest distributor, samples, or the just-published Stover Engineering Manual.

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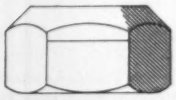
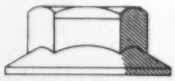
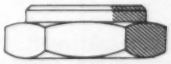


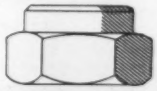
Automation
¼"– 1"
A basic nut for general use.



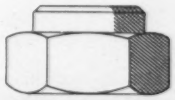
Flange
#8 – ½"
For clamping soft and/or thin materials.



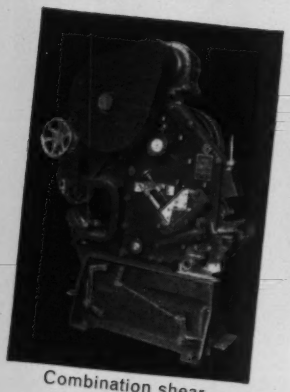
Thin Hex Collar
¼"– 1½"
Used where space is a problem, such as on pinion and pulley shafts.



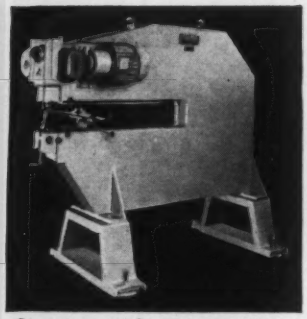
Hex Collar
⅞"– 2"
Lower on-torque in the larger sizes than Automation style.



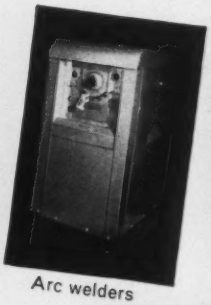
Heavy Hex Collar
⅞"– 2"
Used where greater bearing surface is needed than available with Hex Collar style.



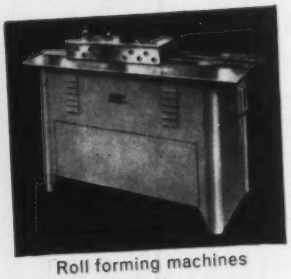
Combination shear, punch and coper



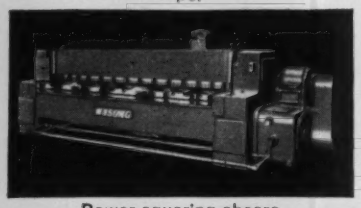
Shearing and forming machines



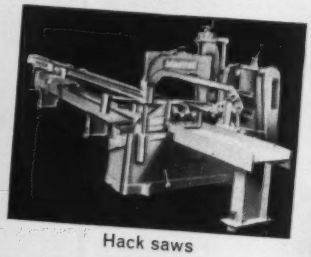
Arc welders



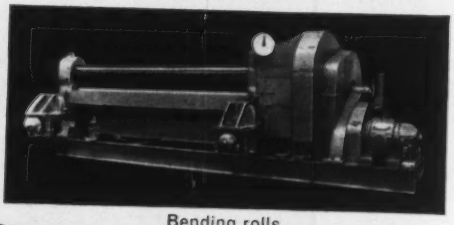
Roll forming machines



Power squaring shears

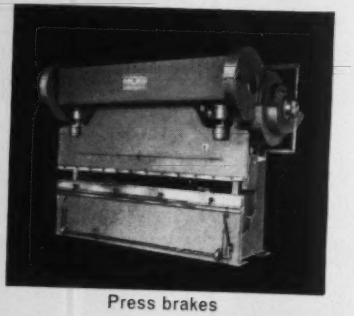


Hack saws

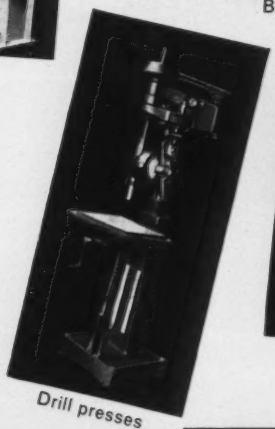


Bending rolls

Hoists

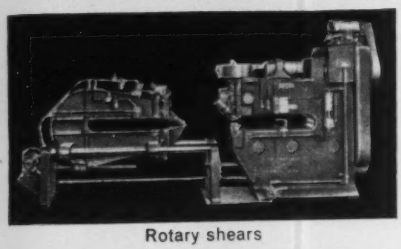


Press brakes

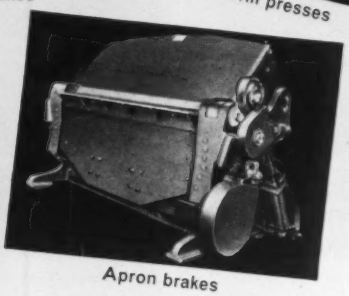


Drill presses

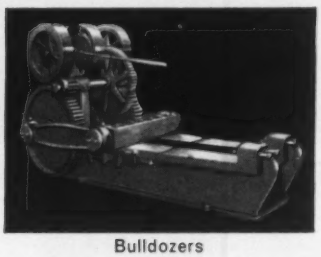
Straight side presses



Rotary shears



Apron brakes



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THE METALOGICS OF METALWORKING MACHINERY

375-ton rolls . . . 7½-lb. punches . . . everything in-between. Whatever you need in metalworking machinery, look to Ryerson. More than 3800 types and models are available—produced by almost 100 of the nation's top manufacturers.

And Ryerson offers unbiased recommendations based on the experience of 117 years' service to metal fabricators. You also get a double guarantee of satisfaction—ours and the manufacturers'. Consult your Ryerson machinery specialist, today.

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STEEL • ALUMINUM • PLASTICS • METALWORKING MACHINERY

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A Nation Comes of Age, And Becomes Better for It

Political and over-emotional reactions to our Summit and Japanese reverses will be over soon. But the letdown may linger: It is a vague feeling of inadequacy. That may be because we have always been "first," or because we never quite admitted to being human as a nation—as we are as a people.

Our loss in prestige comes close to our anniversary of the Declaration of Independence. This can be of great value to us—if we but recognize it.

The air has been rent with crisis stories about how lost we are. Political parties vie with each other as to the real meaning of the Summit crack-up and the mob-induced debacle in Japan. This will pass.

Then we, who must preserve ". . . these truths . . . that all men are created equal, that they are endowed by their Creator with certain inalienable rights, that among these are life, liberty and the pursuit of happiness . . . ," will know our destiny. Somewhere down in our national consciousness we have aged, matured, and clarified our thinking.

On this coming Independence Day, let us settle once and for all the "question" of the ages: Can we afford to let the fear of annihilation cause us even to consider submitting to appeasement, surrender, or a co-existence which leads to loss of liberty and human dignity? The answer should be clear. It is "NO" under any circumstances.

The Declaration was clear in 1776. It applies today . . . "That to secure these rights, governments are instituted among men, deriving their just powers from the consent of the governed."

No matter what happens to our image abroad, what counts most is the image we carry of ourselves in our hearts. The desire for eclat and approval from abroad did not start this nation on its way in 1776. What others think of us in the years ahead should not be the directing force of our actions.

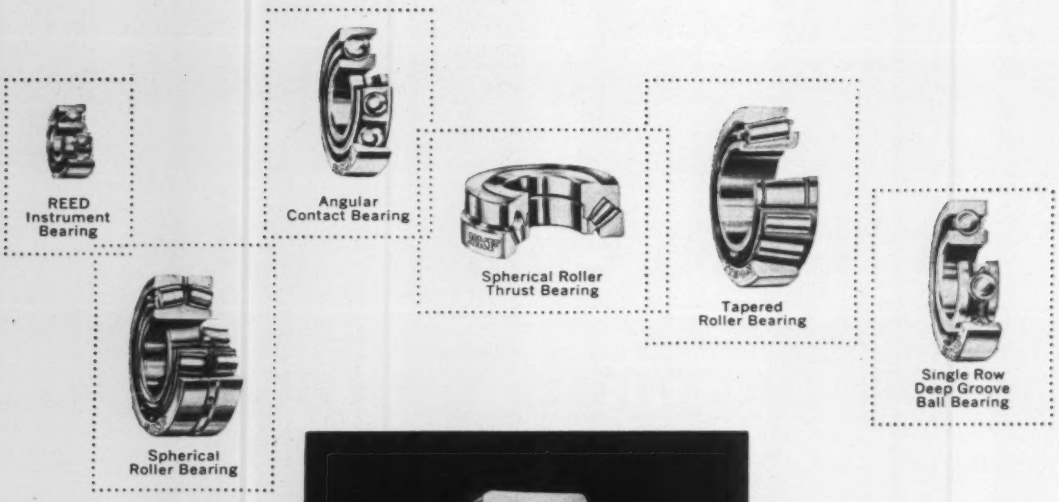
We will get along. Emulating the strength of the signers of the Declaration of Independence will bring us through any crisis, whether it be national, international, cataclysmic or nuclear.

To be humbled, to be reviled, or to be ridiculed never harmed a nation which knew in its heart it was just, truthful and courageous.

That's America today!

Tom Campbell

Editor-in-Chief



What's a "special size" in production bearings?

SKF makes so many standard sizes, there's practically no such thing as a "special size" of bearing. They range from tiny instrument bearings right up to four-row tapered roller bearings—and account for almost every possible bore size in-between.

Take SKF's standard cylindrical roller bearing, for example. It's promptly available in 154 sizes of single- and double-row types—for shaft diameters ranging from 1" to 9.5". Every size, in both types, offers high radial capacity in relation to its size and operates at highest speeds because of its very low friction.

So, before you specify a "special size" bearing, call the nearest SKF sales office first. The odds are better than 1,000 to 1 that there's already a standard SKF bearing of exactly the size you need. 6007

Spherical, Cylindrical, Ball, "Thrust" Tapered and REED Miniature Bearings

EVERY TYPE—EVERY USE

SKF

SKF INDUSTRIES INC. PHILADELPHIA 32, PA.

Open-Coil Gas Alloying

It's now economically possible to change the chemistry of coiled steels. A major breakthrough—developed by Lee Wilson Engineering Co., Inc.—centers on an open-coil process of gas alloying. Among the uses for this process are: production of low-carbon enameling steel that needs only one coat of enamel; making of non-aging rimmed steel. Estimated savings for steel coils range from $10-$40 per ton.

Strong Joints at 900°F

High-strength aircraft and missile fasteners combine good strength with light mass. These threaded fasteners withstand up to 200,000 psi at 900°F. Room-temperature ratings include: tensile strength, 260,000 psi; yield, 215,000 psi; shear strength, 156,000 psi. Endurance limit after 8,000,000 cycles at 900°F is 90,000 psi.

Coating Adheres Over Dirt

Applied by spray or roller-coating methods, a high-gloss baking synthetic can be applied to uncleaned and untreated aluminum. It forms a tough, abrasive-resistant film. At a film thickness of 0.0002 in., 1 gal covers more than 3000 sq ft. Baking schedules vary from 10 seconds at 500°F to 15 minutes at 300°F.

Lubricates at −100°F

Synthetic oil, for use between −100° to +250°F, protects parts from humid and/or salt conditions. This light-viscosity diester oil is called Anderol L-423. It features good oxidation stability and a low evaporation rate. The new lubricant also insures low starting and running torques.

Improves Copper Soldering

A tin-immersion process improves the solderability of printed circuits and other electronic parts. Called Wes-X 500, the new process imparts a white color to copper and copper-base alloys. This prevents oxidation during soldering. Tin-immersion salts give rapid coverage at room temperatures. Neither cyanide nor mineral acids are used. Therefore only normal precautions are needed.

Refractory Cements

Two new refractory cements withstand temperatures of 4300° and 5000°F, respectively. They serve as surface coatings for solid-state devices, ceramic-tube seals, thermocouples and high-temperature sensors for aircraft, missiles, wind tunnels and combustion units. They also meet use as sealers, mortars and casting compounds. Good mechanical properties are reported at high heats.

Miniaturized Metalworking

Miniaturization in electronics is reflected in a rash of new machine tools. Producing precision parts smaller than the head of a match calls for special methods and equipment. Inside sources report many new machines will be unwrapped at the coming Machine Tool Exposition. Some of these Lilliputian tools are precision-thread and form grinders. Many are automatic.

Study Machine Tool Needs

To lease—or not to lease—is often the question. Leasing of machine tools and other capital goods has enjoyed a flood of publicity. As a result, it's often looked upon as a "cure-all"—with the ability to heal all financial ills. This isn't always true. Leasing should be regarded as just another tool which—when used wisely—can benefit industry.

No Tax Cut in Sight

Industry's hopes for tax cuts this year or next are useless—except, perhaps for foreign operations. Major taxes, including the 52-pct corporation tax, will continue. The White House admits that the President's projected $4.2 billion surplus for 1961 is in "acute jeopardy". This is an understatement. Congressional spending makes a surplus impossible.

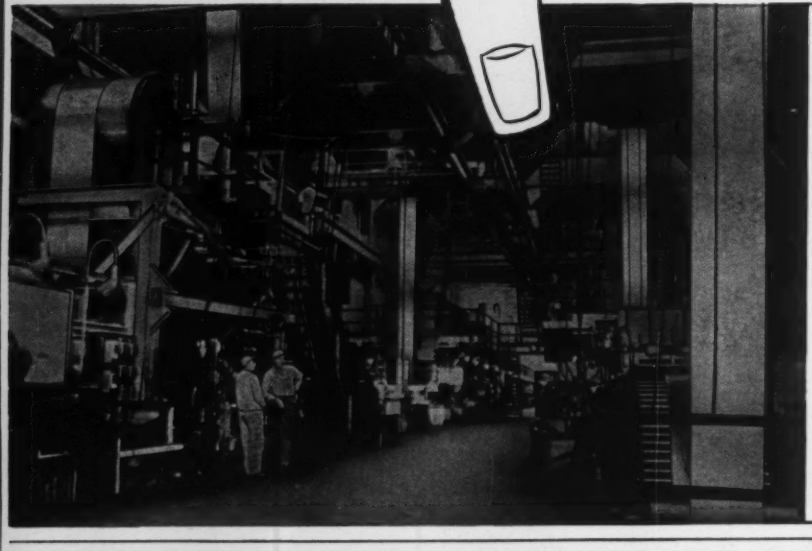
What makes the difference between one galvanizing line and another? How can you save money on the purchase of a Continuous Galvanizing Line? What are the different components that must be considered in the designing of a line?

Aetna-Standard answers these and other questions in this new booklet on Continuous Galvanizing Lines. Other information includes information on the number of lines operating in the world; and pictures of different components of Continuous Galvanizing Lines.

A copy will be mailed promptly upon receipt of your request. BLAW-KNOX COMPANY, Aetna-Standard Division, Pittsburgh, Pennsylvania.

BLAW-KNOX

Aetna-Standard Division
BLAW-KNOX



BLAW-KNOX

THE WORLD'S LEADING DESIGNER AND BUILDER OF CONTINUOUS GALVANIZING LINES

Aetna-Standard Division
BLAW-KNOX

LETTERS FROM READERS

The Classroom

Sir—I am an instructor in finance at Seton Hall University, and am interested in one of your excellent articles, The IRON AGE Special Survey Report to Management on Metalworking Capital Appropriations. It, I believe, was published sometime in early 1959. I would appreciate it very much if you would send a copy with the current survey on this subject. Sui-Lin Hsu, Newark, N. J.

▪ **Copies are on the way.—Ed.**

Touchdown

Sir—You have scored again! The article on descaling of steel strip in your June 6 issue is certainly timely. Will you please supply me with three copies of the article? Astor L. Thurman, Youngstown, O.

▪ **Reprints are in the mail.—Ed.**

Real Managers

Sir—Your Special Report article entitled "What Industry Must Do to Make Foremen Real Managers," which appeared in the June 2 issue, was found to be very interesting and very educational.

Would you please forward to me 12 reprints of the article.

Sir—Would you please send us a copy of the Special Report.—Lynn D. Caldwell, Assistant to the Commander, Ordnance Corps, Benicia Arsenal, Benicia, Calif.

▪ **Reprints have been sent.—Ed.**

In Agreement

Sir—A recent issue of the IRON AGE magazine has passed over my desk, and I note with particular interest your very fine editorial entitled, "Anyone for Khrushchev? If So, They Are Plain Nuts!"

This is certainly a fine outspoken article and I heartily concur in your statements and sentiments. I am making a determined effort to win the election Nov. 8 as Congressman from the 8th District of Indiana because I so firmly believe we have no time to lose.

We have much to do to overcome past infringements on our American rights and the attempts to undermine our constitution. Each and every loyal citizen must take action.

My sincere thanks to you for writing the fine editorial, and I hope you will write many more because you have a way of expressing yourself that hits "home." — A. V. Burch, president, Burch Plow Works, Inc., Evansville, Ind.

Newsfront

Sir—The June 9 issue of The IRON AGE had an article in the "Newsfront" section titled "Increase Fatigue Strength."

If possible, could you kindly supply me with information or advise the source of this article. The article is very interesting since fatigue is a major problem in power transmission chain.—C. W. Eastep, Supervisor, Engineering Laboratory, Morse Chain Co., Ithaca, N. Y.

▪ **Contact U. S. Department of Commerce, National Bureau of Standards, Washington 25, D. C. —Ed.**

"Smith, is your social security number 702-463-222, or 607-583-654?"

Large or small INDUSTRIAL CUT GEARS

- FURNISHED COMPLETE
- CUSTOM CUT FROM YOUR BLANKS
- HEAT-TREATED, CASE OR FLAME-HARDENED

SIMONDS GEAR produces a complete line of industrial cut gears in a full range of sizes from cast or forged steel, gray iron, bronze, Meehanite, rawhide or bakelite. Also heat-treated, case or flame-hardened carbon or alloy steel. Or, you may have your own gear blanks custom cut to your order. Same quality . . . same prompt service. Send us your requirements for quotation.

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Quality Gears for over 65 Years

Got a severe WEAR problem? Your answers are in this booklet

This new booklet is crammed with information on Carmet Cemented Carbides . . . man's hardest, most abrasion resistant metal . . . and on design techniques that make the most of Carmet's unique properties.

Properly designed, Carmet Cemented Carbides give outstanding service in applications involving severe wear and abuse. They possess an extraordinary combination of extreme hardness and strength, higher than any metal or alloy . . . cast, rolled or forged. They have three times the stiffness of steel . . . up to 100 times the abrasion resistance.

In Carmet's new booklet, the designer will find the charts, graphs, case histories, and tables of information needed for intelligent selection and application of the Carmet Cemented Carbides. And, there's a special section on design criteria for top performance. Ask your local Allegheny Ludlum representative for a copy, or write: *Allegheny Ludlum, Carmet Division, Oliver Building, Pittsburgh 22, Pennsylvania. Address Dept. A6-5.*

CARMET® AL

CEMENTED CARBIDE • DIVISION OF ALLEGHENY LUDLUM

2008

Chicago Victory

▪ A week or two ago we received a memo from Keith Bennett, our Chicago regional editor. He asked our OK to take part at IBM in one of these highly-publicized management war games.

The idea was that groups of business reporters would compete, by means of a computer, in theoretical management of a company.

We were a little leery, but gave our go-ahead. The only instructions: "Win! The IRON AGE's reputation (and yours) is at stake."

Our confidence was not misplaced, however.

Full Report—Reports Mr. Bennett in terse executive style:

"We won the IBM management game hands down. Built a $9 million company into a $19 million operation in nine quarters, using IRON AGE methods."

A telephone call to the war games executive established that he was president of his company, one of six groups. Not all fared as well as ours, unfortunately. One company actually went right off the bottom of the graph setting, we understand, a new standard for mismanagement.

What was the secret?

Ahem! — "Well," replied President Bennett, "We put 6 pct of our sales into R & D, 5 pct into sales promotion and marketing, reduced our manufacturing costs, and raised our prices. We did so well we ended up with $2 million we didn't know what to do with."

We secretly suspect that the big factor was cutting manufacturing costs and raising prices. Nice, if you can do it away from the computer.

Metal Coatings Dollar

The reasons for precoating one metal over another are many and varied. They run the gamut from getting better corrosion and wear resistance to better appearance and lower cost. In many cases, alert management has already adopted the use of precoated metals as a further speed-up of fast-moving production lines. The growth in their use is only the beginning of a trend that's shaping up rapidly.

With the many new coatings and techniques now on the market, the job of keeping up with the pace is far from simple. For this reason, the editors of The IRON AGE have chosen this subject for a 16-page special feature.

All the Facts—This feature is No. 3 in the 1960 award-winning series "How to Get More for Your Metalworking Dollar."

Starting on page 137, it tells users and potential users of metal-coated materials why, where and how they can best serve their purposes. It's a fact-filled roundup directed to management, production, engineering and purchasing executives in the metalworking field.

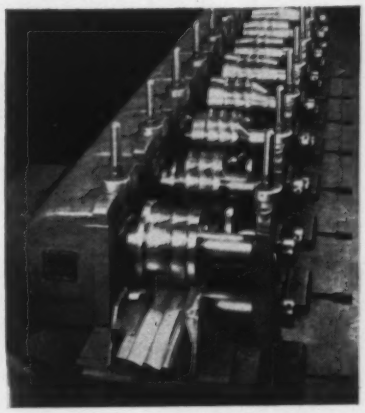
Since the only way to meet today's competition is to improve your cost picture, it might be well to consider the use of precoated metals.

The first section discusses the advantages of using precoated metals and how they can fit into the production line. Contained in the second section is a handy reference of vital information to aid in the selection of these materials.

It consists of a representative list of the endless variety of precoated metal combinations. Also included in the table are data on products available, and typical uses.

The feature also deals with the forming and joining of the various types of precoated metals, and offers some purchasing tips—all of which point up how precoated metals streamline production, improve quality, and stretch your metalworking dollar.

Whether or not you're already using precoated metals, the large influx of new materials—tailor-made to perform specific jobs—deserves careful study. It may change your whole concept of production.



Yoder Roll-Forming Equipment mass-produces shapes accurately, economically

Yoder Roll-Forming Equipment, even with part-time operation, can effect significant savings in many metal working applications and industries. Shapes, simple or complex, can be quickly and economically produced the Yoder way from a wide variety of flat-rolled coated or uncoated stock ... in thickness up to ¾ inch ... in speeds up to 50,000 feet per day.

Yoder engineers flexibility and precision into metal forming operations. For example: many basic shape modifications, such as coiling, welding, notching, ring-forming, perforating, and cutting to length can be simultaneously accomplished with little or no additional labor cost.

Yoder also makes a complete line of Rotary Slitters and Pipe and Tube Mills. Profit from Yoder's years of engineering and service experience, contact your local Yoder representative or send for the Yoder Roll-Forming Manual.

This fully-illustrated 88-page book clearly discusses every important aspect of Yoder Roll-Forming Equipment and methods ... it's yours for the asking!

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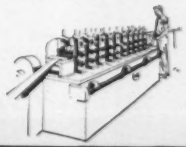
5510 Walworth Avenue • Cleveland 1, Ohio



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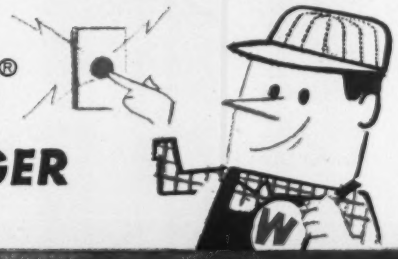
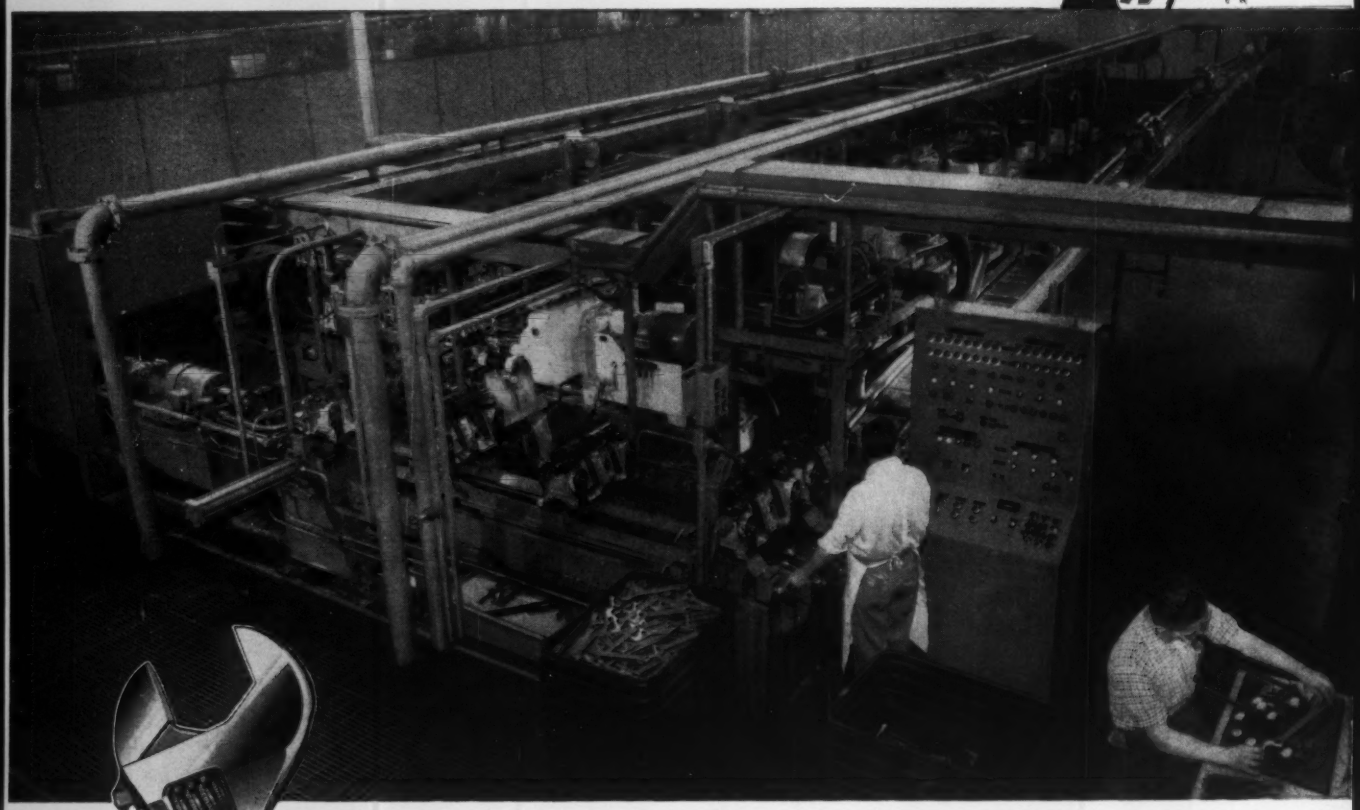
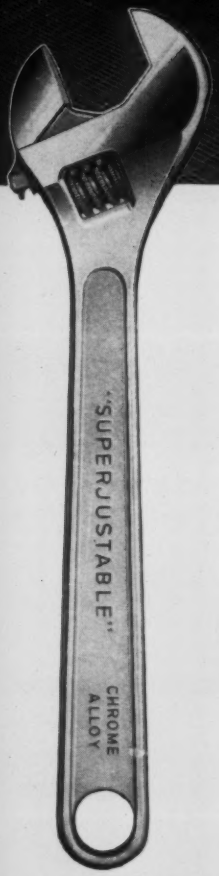
WORK BETTER • LAST LONGER







• AUTOMATED MACHINING guarantees smooth adjustment, exact fit in every wrench. This million dollar transfer machine was designed especially for Williams' Superjustable® wrench production. A push of a button puts 28 stations in operation... consistently machining to uniformly close tolerances. Fully machined wrench heads are constantly checked on special gauges to further insure perfect fit with sliding jaws, worms, pins and springs. No other manufacturer has this automated equipment to so precisely machine wrenches that *work better... last longer.*

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TOOLS of INDUSTRY

Superjustables® are available in regular or locking styles in sizes ranging from 4 to 24 inches, Black or Chrome finish.

COMING EXHIBITS

Machine Tool Exposition—Sept. 6-16, International Amphitheatre, Chicago. (National Machine Tool Builders Assn., 2139 Wisconsin Ave., Washington 7, D. C.)

Production Engineering Show — Sept. 6-16, Navy Pier, Chicago. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Coliseum Machinery Show — Sept. 7-15, Chicago. (Contact: A. B. Perkins, 2216 South Hill St., Los Angeles 7, Calif.)

Iron & Steel Show — Sept. 27-30, Cleveland Public Auditorium, Cleveland, O. (Association of Iron & Steel Engineers, 1010 Empire Bldg., Pittsburgh 22.)

Metal Show—Oct. 17-21, Convention Hall, Philadelphia. (American Society for Metals, Metals Park, Novelty, O.)

Die Casting Exposition & Congress—Nov. 8-11, Detroit Artillery Armory, Detroit. (The Society of Die Casting Engineers, 19382 James Couzens Highway, Detroit 35.)

MEETINGS

JULY

Truck Trailer Mfrs. Assn.—Annual summer meeting, July 10-13, The Homestead, Hot Springs, Va. Association headquarters, 710 Albee Bldg., Washington, D. C.

Cast Iron Pipe Research Assn.—Annual meeting, July 13-14, The Seaview Country Club, Absecon, N. J. Association headquarters, Prudential Plaza, Suite 3440, Chicago.

Metal Lath Mfrs. Assn.—Summer meeting, July 20-21, Carlton House, Pittsburgh. Association headquarters, Engineers Bldg., Cleveland.

American Electroplaters' Society—Annual convention, July 24-28, Statler Hotel, Los Angeles. Society

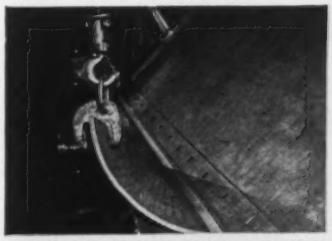
(Continued on P. 16)

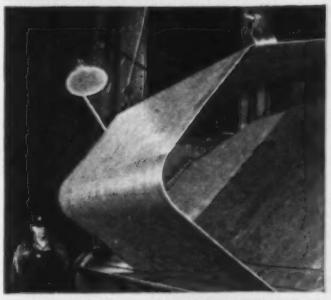
Bending Steel Plates for WELDMENTS?

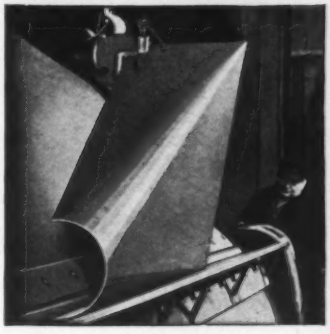
do it economically with

CHICAGO® POWER BENDING BRAKE

(no dies needed)





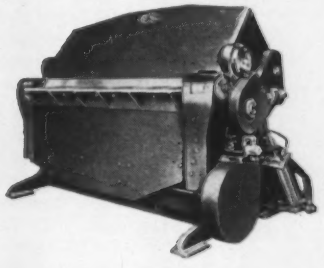


The accompanying illustrations give an idea of the versatility of the CHICAGO bending brake. No dies have to be changed or adjusted—no dies are used on these jobs. Yet, duplication is easily obtained on successive pieces. The machine is quickly adjustable for different thicknesses of material up to rated capacity. Automatic stop regulates the angle of bend. This, too, is adjustable to any degree of bend. The ease of changing from one job to another and the elimination of die costs make the CHICAGO bending brake the economical method for bending steel plates for weldments.

Many standard sizes are available with capacities for bending mild steel up to 12 feet by ¾ inch or 16 feet by ½ inch. Also many standard sizes in hand and power operated models for sheet metal.

BULLETIN P-55
This bulletin gives the details of how these and many other jobs are handled. Also complete description of the machine and specifications of the standard sizes.
Ask for a copy.

Front view of one of the heavy duty models of CHICAGO power bending brake showing the operation end of the machine.



Recommendations for any job on request.

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Press Brakes • Straight-Side Presses • Press Brake Dies

Hand and Power Brakes • Special Metal-Forming Machines

DREIS & KRUMP MANUFACTURING CO.

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One of the outstanding advantages of Townsend Tuff Tite fasteners is that they provide an economical means for leakproof joining of metal, asbestos, porcelain or plastic. The pre-assembled conical neoprene washers flow into the holes as the fasteners are seated, filling them and making waterproof seals. Tuff Tites are effective for any application requiring leakproof joints, such as those needed in the construction or appliance industries.

Tuff Tite advantages include ease and economy of installation, surface protection and vibration resistance. Standard items are immediately available from jobbers and warehouses. Tuff Tites are also available in numerous special designs to suit any application need.

If you are joining metal, plastic, porcelain or asbestos, you should know about Townsend Tuff Tites. Ask your Townsend representative, or we will send you complete literature. Townsend Company, Engineered Fasteners Division, P.O. Box 71-B, Ellwood City, Pa.

Townsend Company

ESTABLISHED 1878

Engineered Fasteners Division

ELLWOOD CITY · PENNSYLVANIA

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MEETINGS

(Continued from P. 15)

headquarters, 445 Broad St., Newark, N. J.

SEPTEMBER

American Machine Tool Distributors Assn.—Annual meeting, Sept. 3-4, LaSalle Hotel, Chicago. Association headquarters, 1500 Massachusetts, Ave., N. W., Washington 5, D. C.

Assn. of Lift Truck & Portable Elevator Mfrs.—Fall meeting, Sept. 12, The Cavalier Club, Virginia Beach, Va. Association headquarters, One Gateway Center, Pittsburgh 22, Pa.

Electronic Industries Assn. — Fall conference, Sept. 13-16, French Lick-Sheraton, French Lick, Ind. Association headquarters, 1721 DeSales St., N. W., Washington, D. C.

American Die Casting Institute—Annual meeting, Sept. 14-16, Edgewater Beach Hotel, Chicago. Institute headquarters, 366 Madison Ave., New York.

National Foundry Assn. — Annual meeting, Sept. 22-23, Edgewater Beach Hotel, Chicago. Association headquarters, 53 W. Jackson Blvd., Chicago.

Porcelain Enamel Institute, Inc.—Annual meeting, Sept. 25-28, The Greenbrier, White Sulphur Springs, W. Va. Institute headquarters, 1145 19th St., N. W., Washington, D. C.

Farm Equipment Institute—Annual convention, Sept. 25-28, The Statler Hilton Hotel, Dallas, Tex. Institute headquarters, 608 S. Dearborn St., Chicago.

American Welding Society — Fall meeting, Sept. 26-30, Pittsburgh. Society headquarters, 33 West 39th St., New York.

OCTOBER

Metal Lath Mfrs. Assn.—Fall meeting, Oct. 6-7, The Greenbrier, White Sulphur Springs, W. Va. Association headquarters, Engineers Bldg., Cleveland.

OHIO RUBBER

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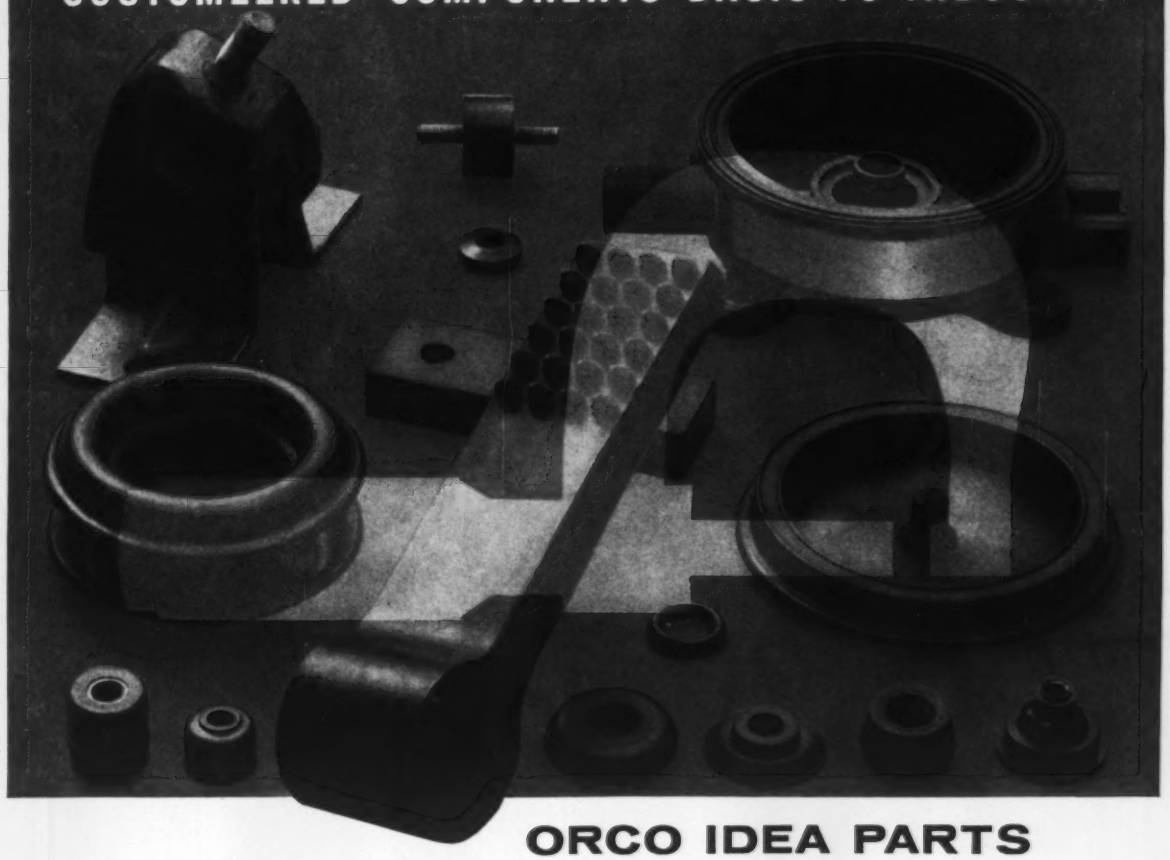

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OHIO RUBBER IS THE GOOD SOURCE FOR THE OEM!

ACROSS THE BOARD in industry, ORCO IDEA PARTS offer the design engineer product quality evolved from Ohio Rubber's years of experience in supplying "Customeered"* components for outstanding original equipment manufacturers nationwide.

ORCO CUSTOMEERING* is geared to cut production costs—to deliver a better part. And it goes to work for you as soon as performance requirements are checked, a materials recipe is formulated, expense-shaving design modifications, if necessary, suggested. The full scope of ORCO integrated design, research and practical ingenuity in custom-manufacture of rubber, synthetic rubber, silicone rubber, polyurethane, and flexible vinyl components is focused on your component.

ORCO CAPACITY offers the facilities of four modern plants. These include design, building, and maintenance of precision molds and dies . . . permanent bonding-to-metal . . . compression and transfer molding . . . extruding of all shapes, sizes, and types . . . complete laboratory facilities . . . statistical quality control . . . coordinated production control.

SUGGESTION — send for ORCO Bulletin 715 for the complete money-saving story of "Customeering". It's yours for the asking!

*Trademark of The Ohio Rubber Company

DE-160

ORCO **THE OHIO RUBBER COMPANY**

General Office • WILLOUGHBY, OHIO • WHitehall 2-0500

A DIVISION OF THE EAGLE PICHER COMPANY

EAGLE PICHER

Three Reasons General Electric D-c Drives are Best for

1. Costly Maintenance Shutdowns Reduced

D-c Main Drives

In metal-rolling mills—where minutes of downtime are measured in thousands of dollars—fast, simplified maintenance of main drive motors is critical.

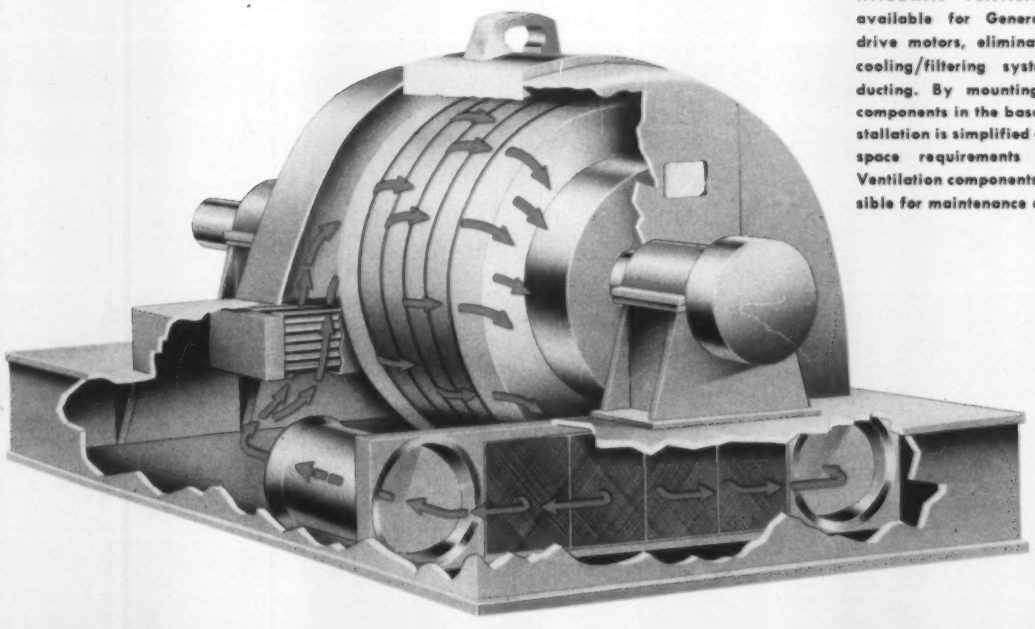
The revolutionary "TOP-FORWARD" twin-drive shown above exemplifies General Electric's continuing emphasis on better design for ease of maintenance. Shaft extension of the rear motor passes *beneath* the forward motor instead of directly over as in conventional designs. This unique drive arrangement allows clear access by overhead crane to all bearings, air-shields and other components of *both motors*.

Shorter over-all length of drive substantially reduces space required and provides cost savings in foundation construction. Improved Class B Insulation system for armatures and fields, utilizing proven resins and compounds, provides greater resistance to heat, moisture and dirt.

Progress Is Our Most Important Product

GENERAL ELECTRIC

by New Advances in D-c Drive Design

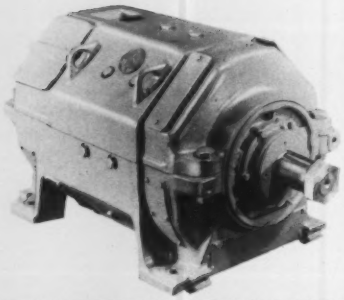


INTEGRAL VENTILATION SYSTEM, available for General Electric main drive motors, eliminates separate air-cooling/filtering system and related ducting. By mounting all ventilation components in the base of the drive, installation is simplified and supplemental space requirements are eliminated. Ventilation components are easily accessible for maintenance and inspection.

Three Reasons General Electric D-c Drives are Best for

2. G-E Drives Are Durable and Reliable—

D-c Auxiliary



GENERAL ELECTRIC'S MD-600 ARMORED MOTOR is built to withstand severe shocks, give maximum reliability. Class H insulation provides superior protection—permits greater work capacity.

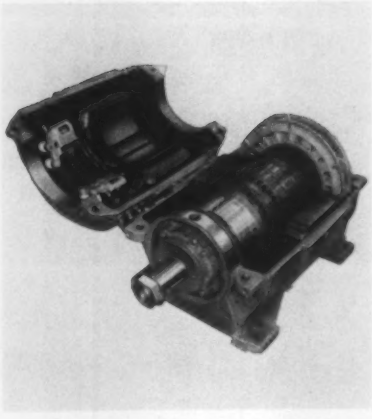
Designed to exceed the requirements of the most advanced continuous processing systems, General Electric MD-600 series armored mill motors are built to withstand regular exposure to hot scale, steam and corrosive sprays. Improved high temperature insulations have appreciably lengthened motor life.

Designed to meet or exceed AISE standards in all respects, General Electric's armored motor offers unmatched flexibility. This motor can be adapted to fit any of five different ventilation requirements simply by adding or removing standard covers. No other modifications are necessary.

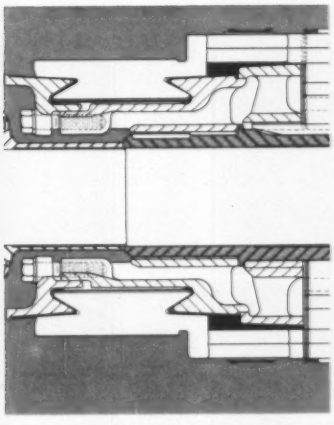
Progress Is Our Most Important Product

GENERAL ELECTRIC

Meet Demands of Continuous Processing



DESIGNED FOR EASY ACCESS, top half of General Electric MD-600 motor frame swings open nearly 180° to permit fast armature removal. Positioning keys in frame heads facilitate armature alignment.

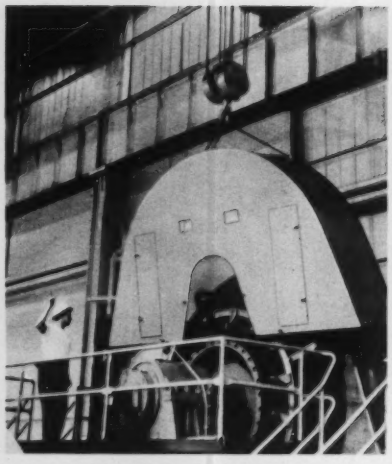


DESIGNED FOR EASE OF MAINTENANCE, the armature on General Electric armored motors is assembled on a steel spider so the shaft can be pressed out without disturbing commutator or windings.

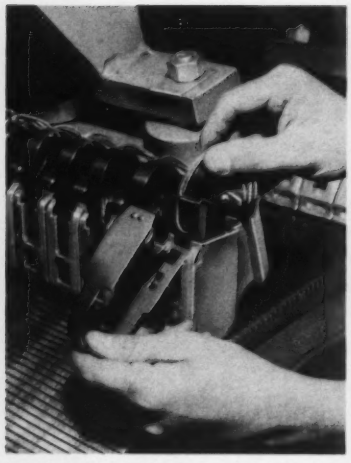
BUILT TO DRIVE HEAVIER LOADS—accelerate, start, stop and reverse faster—MD-600 motors meet toughest demands of automated systems. Integral feet on the endshields allow the armature to stand alone when removed from frame.

Three Reasons General Electric D-c Drives are Best for

3. G-E Drives Give You New Competitive



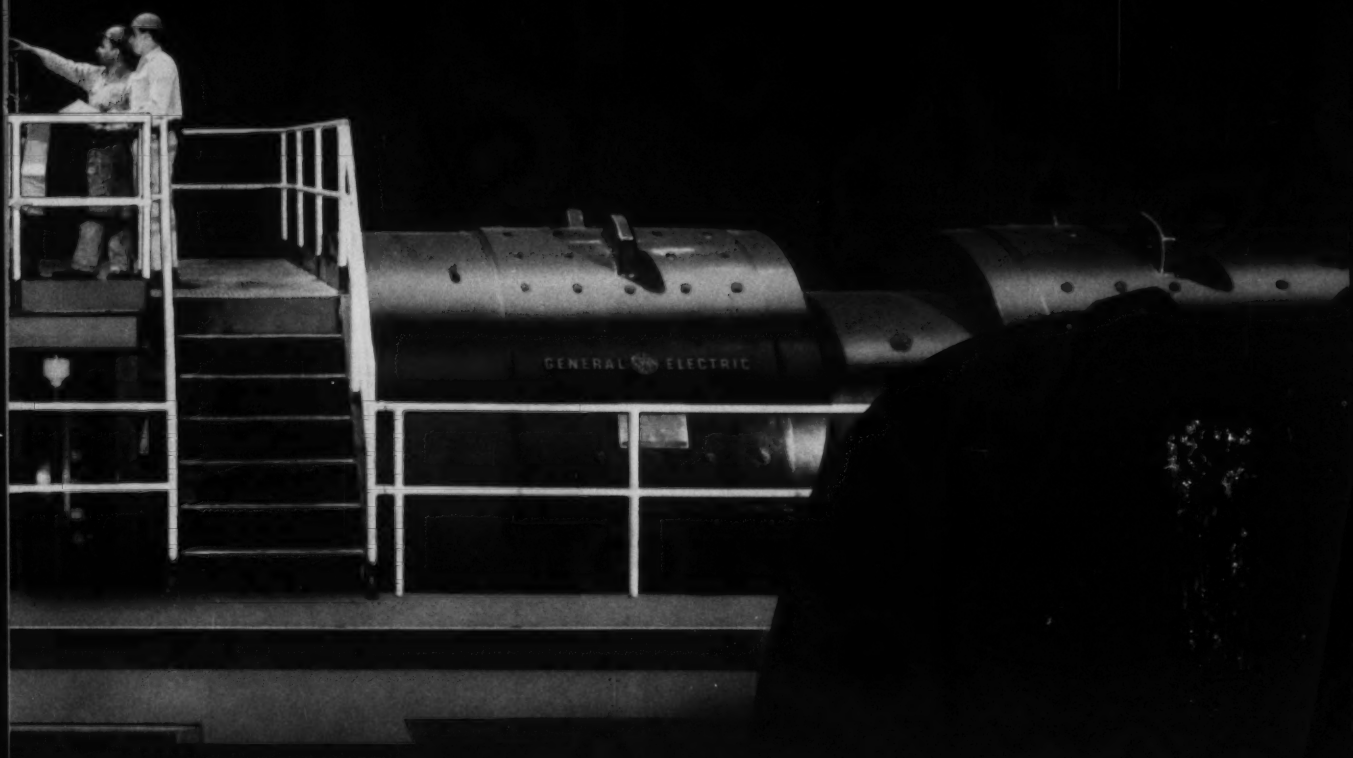
NEW QUICK-REMOVABLE COVERS use no bolts, permit easy access. Tapered guide pins, attached to "TOP-FORWARD" d-c main drive motor frame, accurately position covers on base and frame. Removal and replacement time is reduced to a minimum.



CONSTANT-PRESSURE BRUSH-HOLDERS eliminate all pressure adjustments, give optimum contact at all times. General Electric brush-holder design permits observation of brush wear. Brush can be replaced in seconds.

DISC-LUBRICATED BEARINGS provide positive oiling during all operating conditions. Self-aligning, cast-steel, babbitt-lined bearings can be removed without disconnecting oil piping—maintenance is simplified.

Automated Production Systems



Advantages to Meet the Challenge of the 60's

Higher processing speeds, tighter production schedules and better product quality are requisites of industrial growth in the coming decade. As continuous processing and automation techniques spread throughout industry, rapid maintenance of basic equipment becomes an increasingly important competitive advantage.

General Electric's simplified-maintenance drive design gives you this advantage plus the high thermal and mechanical limits and improved commutation demanded of automated processes.

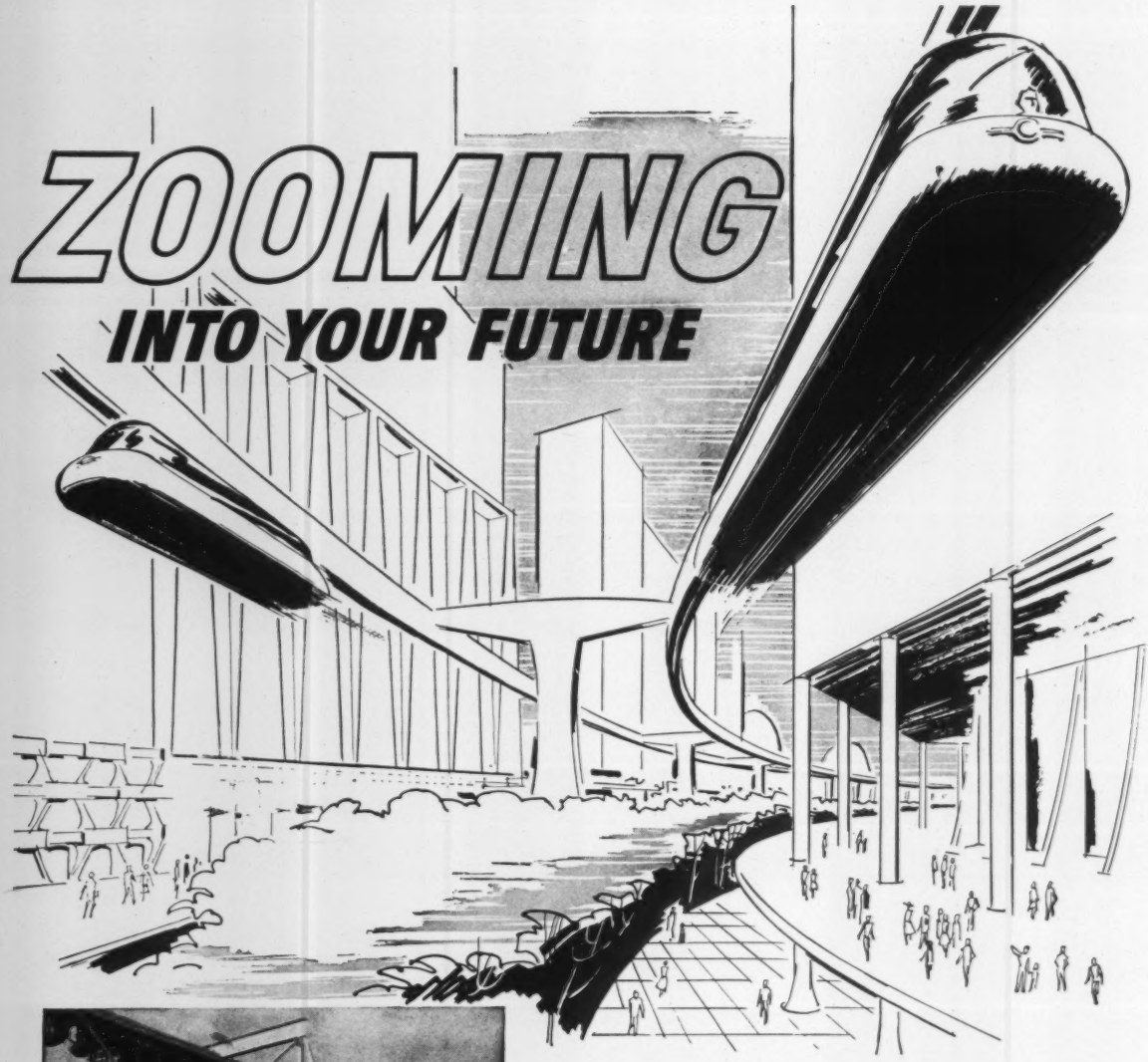
Let your G-E Sales Engineer show you how easily new d-c main and auxiliary drives can fit into your modernization plans, improve operating efficiency and help you meet the challenge of the '60's. For descriptive information on d-c motors for heavy industry, write Section 772-9, General Electric Co., Schenectady 5, N. Y. *Large Motor & Generator Dept., Schenectady, N. Y./Direct Current Motor & Generator Dept., Erie, Pennsylvania.*

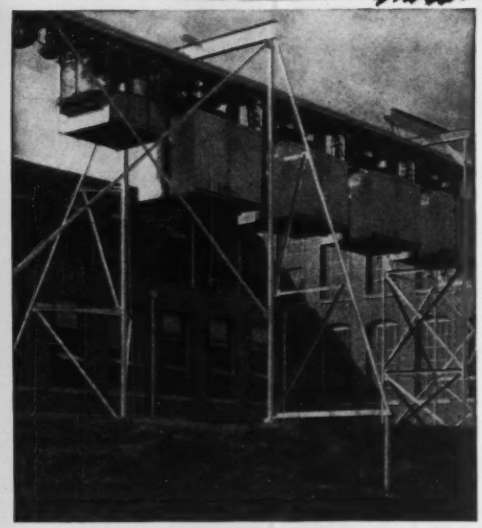
Progress Is Our Most Important Product

GENERAL ELECTRIC

D-c Main & Aux. Drives

ZOOMING
INTO YOUR FUTURE





Public transport borrows ideas from American MonoRail

Someday you may ride to work this way because public transport officials borrow from efficient handling methods developed by American MonoRail engineers.

For over thirty years all kinds of materials have moved on monorail tracks in nearly every industry—and beginning with hand pushed carriers, today's developments include systems that are completely automatic from pick-up to deposit.

Heavy—bulky—hard to handle loads travel quickly, safely and directly to their destination—through the air. Only the research and experience of American MonoRail engineers make this equipment possible. Write for Bulletin C-2.

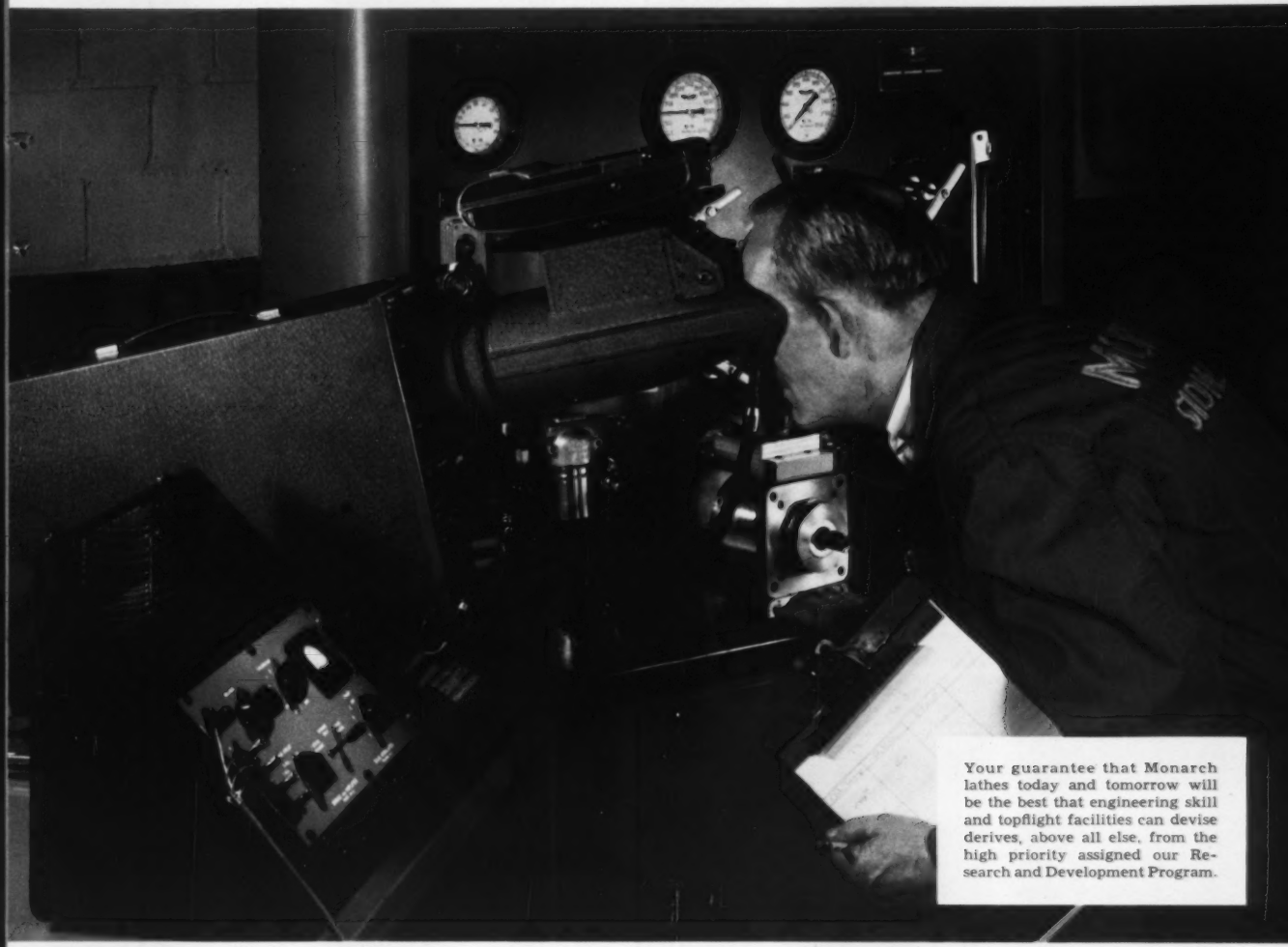
AMERICAN MONORAIL

ENGINEERED MATERIALS HANDLING

1103 EAST 200th STREET CLEVELAND 17, OHIO

DIVISIONS: Conveyor Division, Tipp City, Ohio – Canadian Monorail Co., Ltd., Galt, Ont.

He's making a Monarch Lathe...



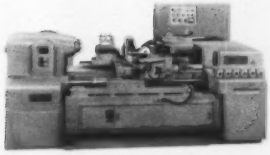
Your guarantee that Monarch lathes today and tomorrow will be the best that engineering skill and topflight facilities can devise derives, above all else, from the high priority assigned our Research and Development Program.

One example of where the extra values come from—in your MONARCH Lathes

Gauging lathe values is as important to you as gauging lathe quality is to us—same coin, both sides. Spending the fewest dollars on a machine tool is far from getting the biggest dollar's worth, of course.

Witness this hydraulic motor check, one of the thousands of checks and tests conducted each year in our Research and Development Laboratory to meet our unique research, development and quality control objectives. Or should we say "our goals of higher productivity, greater accuracy and optimum dollar value to the user?" Same thing.

It is in the sum total of many procedures like these in both engineering and manufacturing, many exclusive with us, that you find the true value of the Monarch Lathe. And that can be concretely expressed this way: *in our Turning Clinic today—using your parts—we can demonstrate Monarch lathes that will increase production, reduce or eliminate finishing, lengthen tool life.* Isn't performance like that the ultimate bargain? Write: THE MONARCH MACHINE TOOL CO., SIDNEY, OHIO.

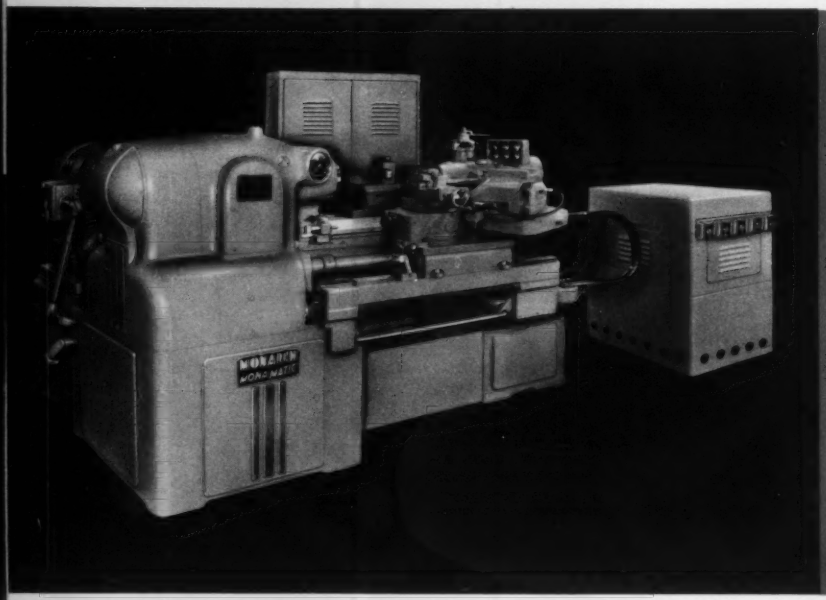


WHEN YOU BUY VALUE
MONARCHS COST LESS

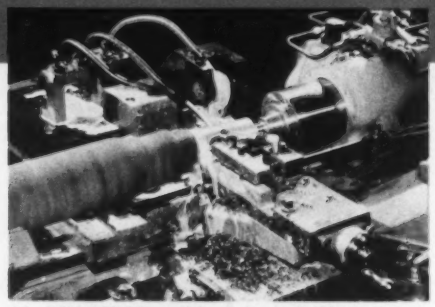
Monarch
TURNING MACHINES

VISIT MONARCH—*We'll turn your part to return you profit*

Don't Tool Up for Tomorrow's Boom with Yesterday's Lathes



MONARCH'S HIGH PRODUCTION LATHES OF TOMORROW...



Model 20-H Mona-Matic is available in 18", 30" and 42" center distance. Swing over bed is 15"; over front slide and rear slide ways, 8". Bed ways are flame hardened and ground.

4.. The New Model 20-H Mona-Matic—A Low First Cost Production Lathe

Take a good look at what we've done to the Mona-Matic concept of production turning. This new machine

(1) *Carries a low price tag, because of simplified design*

(2) *Has fast hydraulic feed and traverse movements, making it exceedingly productive*

(3) *Is a dependable day after day performer, requiring only routine maintenance for years of trouble-free service*

The Model 20-H is a fully automatic double carriage turning machine, with a 60° "Air-Gage Tracer" controlled front tool slide. A variety of automatic cycling arrangements provides high productiveness and versatility. Eight spindle speeds are available by pick-off gears in each of three standard ranges. The tailstock has an air actuated spindle and inbuilt, heavy duty, anti-friction center.

Front carriage feed rate is infinitely variable from 1" to 40" per minute; traverse is 200" per minute. Rear slide feed rate is ½" to 40" per minute while traverse is at 90" per minute.

Four different feeds are available to the carriage. Either a one or a two cut cycle can be furnished. Two cut cycle machines are provided with a selector switch for one or two cut operation.

Imagine better performance at lower cost these days! Why not let us set up a demonstration on your parts? *The Monarch Machine Tool Company*, Sidney, Ohio.

Monarch
TURNING MACHINES

IF IT CAN BE TURNED, THERE'S A MONARCH TO DO IT BETTER AND FASTER

Although Jeffrey patented the principle years ago, STR (Steel Thimble Roller) chain has been constantly improved by Jeffrey to keep pace with industrial progress. Components are designed, materials selected, machined and heat treated to give maximum strength, shock resistance and wearability with minimum weight.

Jeffrey STR chain provides a positive yet flexible means of transmitting power for unit machinery and general industrial drives, and for heavy duty elevating and conveying service. Jeffrey offers four classes to meet various operating conditions.

Ask for engineering assistance on the application of STR chain to suit your needs. The various classes of STR chain are in stock, ready for immediate shipment to you. Chain also can be tailor-made to fit your particular requirements. The Jeffrey Manufacturing Company, 925 North Fourth Street, Columbus 16, Ohio.

JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT...
TRANSMISSION MACHINERY... CONTRACT MANUFACTURING

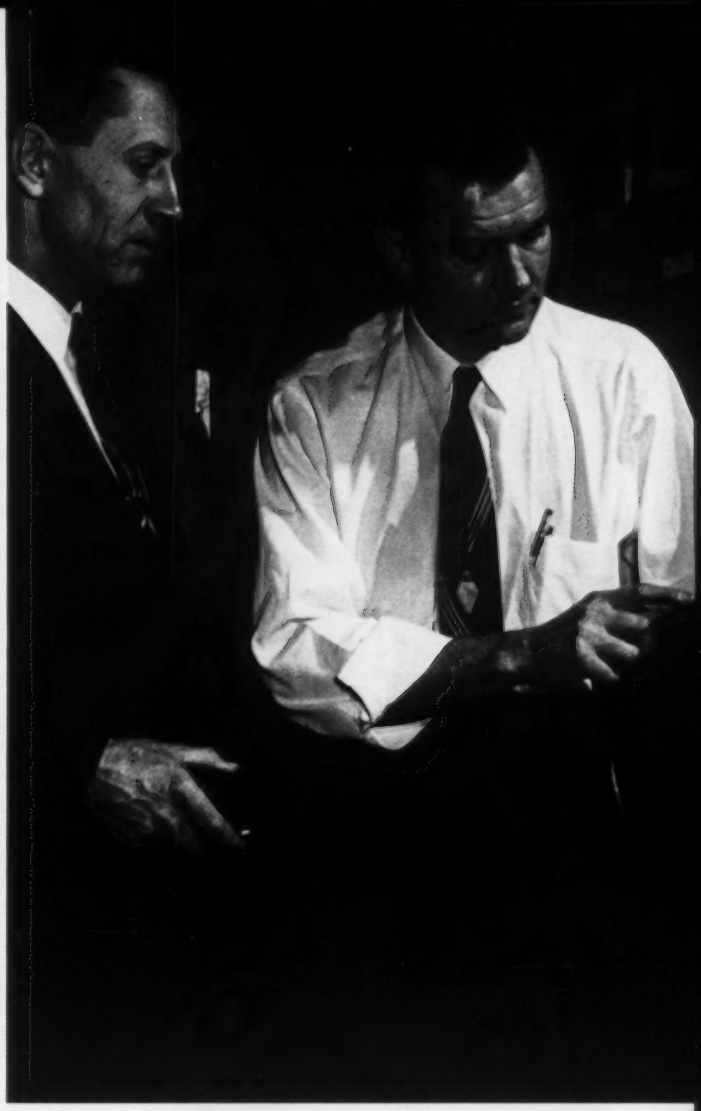
Iron Fireman Manufacturing Company changes to Gulfcut® oil,

GULF MAKES THINGS

A machining job that had been a problem for years was the test given a Gulfcut oil at Iron Fireman Manufacturing Company, Cleveland, Ohio. The job was hobbing 78-tooth, combination 6-8 pitch main drive gears of UMA-3 forging steel. Until the test, hobs had to be reground after every eight gears—once every cutting cycle.

By using Gulfcut 21C oil, Iron Fireman engineers found that they could get the same tolerances and the same production as before, and that they could cut approximately 30 gears or nearly 4 cycles before re-grinding. In addition, they were grinding one-third less off the hobs than before!

"With 275% increase in hob life, we're getting pretty close to optimum on this job," says Stanley J. Kovac,



At right, C. J. Wires, of the Production Engineering Staff, Iron Fireman Manufacturing Company, with T. F. Irving, Gulf Sales Engineer who recommended Gulfcut.

More than 300 kinds of steel, cast iron and brass gears are hobbed by Iron Fireman Manufacturing Company, all with the aid of Gulfcut oils. Pictured here is a 12-tooth, 6 pitch Ledloy steel pump drive gear, O.D. 2.333, tolerances +.0000, −.0015. Oil is Gulfcut 21C.

increases hob life 275% . . .

RUN BETTER!

Chief Production Engineer. "Performance like this has proved Gulfcut oil to us. We're now using it on all gear cutting operations. We cut 300 kinds of gears, of brass and cast iron, as well as steel."

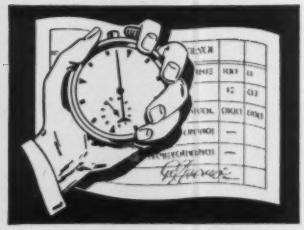
Do you have a tough machining problem? See how Gulf makes things run better! Just call a Gulf engineer at your nearest Gulf office.

GULF OIL CORPORATION
Dept. DM, Gulf Building
Pittsburgh 30, Pa.

GULF

SP-9822

Faster Shearing at Follansbee



The addition of a big Steelweld Pivoted-Blade Shear in the Pittsburgh warehouse of Follansbee Metals, has greatly speeded the plate service they provide.

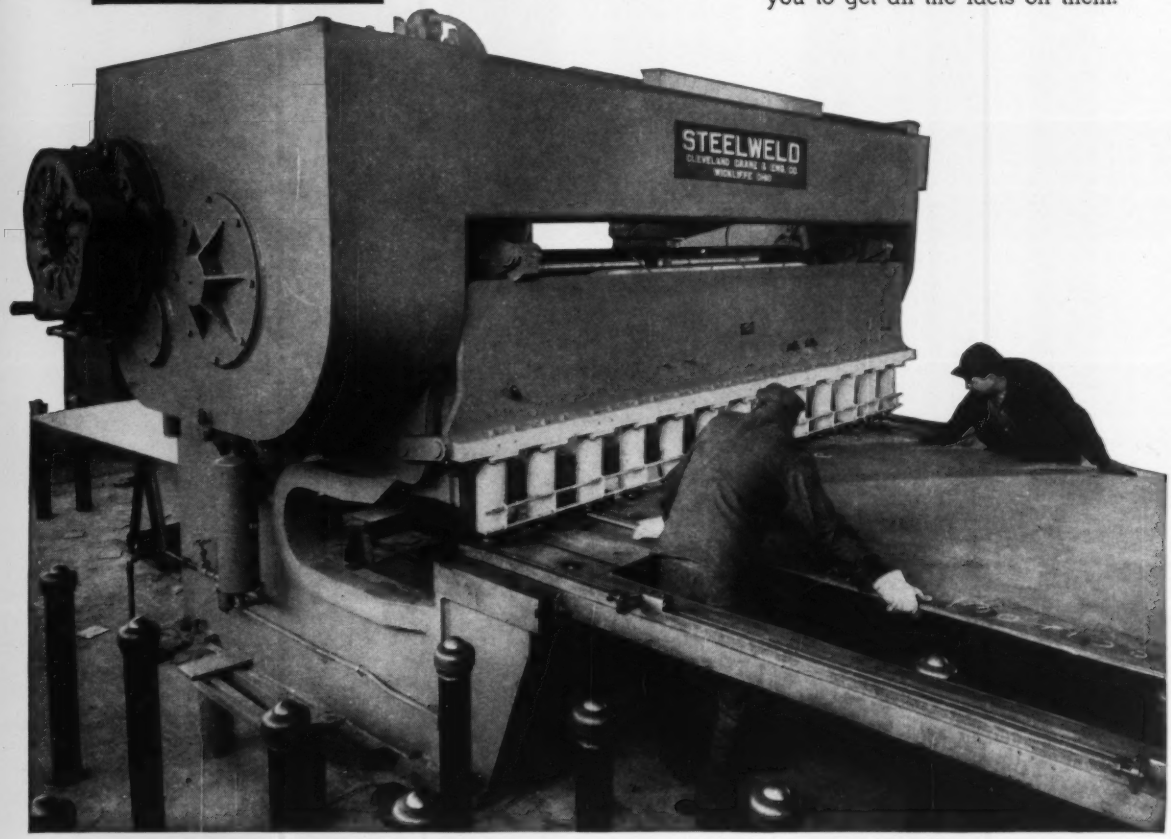
Hot rolled steel plates, stainless plates, floor plates and other metals are cut smoothly and accurately. The machine can handle mild steel up to 12'-0" x ¾". The 36" deep throat permits slitting plates 72" wide down the middle for any length.

Because of the Micro-Set knife adjustment, it is quick and easy to properly set the knife clearance to obtain the best possible cut for every thickness. No other shear has this outstanding feature.

It was only after a thorough study of all makes of shears that Follansbee decided upon Steelweld. And it has fully proven up to expectations.

It makes the cuts as desired in metals of various characteristics. It is fast and easy to operate. All parts are readily accessible and the many adjustments provided minimize and simplify maintenance.

Steelweld Shears are the very latest and most modern on the market today with a host of points of superiority. We urge you to get all the facts on them.



GET THIS BOOK!

CATALOG No. 2011 gives construction and engineering details. Profusely illustrated.

THE CLEVELAND CRANE & ENGINEERING CO.

4845 EAST 282ND STREET • WICKLIFFE, OHIO

STEELWELD PIVOTED BLADE SHEARS

Hortonspheres built of USS "T-1" Steel for Compania Cubana Del Nitrogeno, S. A., Matanzas, Cuba. Designed, fabricated and erected by Chicago Bridge & Iron Company.

Weight cut 50%

In USS "T-1" Steel pressure vessels. Each of these two Hortonspheres in Matanzas, Cuba, has a capacity of 8,750 barrels of anhydrous ammonia. They are 45.5 feet in diameter and each shell weighs about 311,350 pounds. By designing them with USS "T-1" Constructional Alloy Steel, to an allowable working stress of 32,400 psi, the plate thicknesses were reduced to 1.109 inches and 1.075 inches. This is about 50% less than if A212-Grade B fire box quality steel had been used.

Result: Only 363 tons of USS "T-1" Steel were needed for both tanks, reducing by one-half the amount of steel that would otherwise have been required. Freight, handling, welding and erection costs were less—and the user got a stronger, tougher vessel with an overall saving in cost.

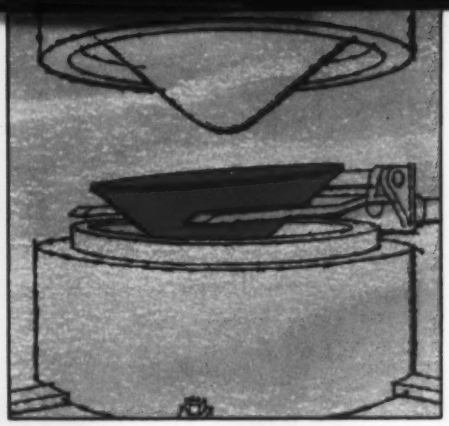
Fabrication steps: Plates of USS "T-1" Steel in widths of 78 inches and 115 inches and lengths up to 19 feet 2-½ inches were shaped cold and field stress relieved. Column plates and some shell plates were stress relieved in the shop. Electrodes used in field welding were low hydrogen type of the E110 strength level and all field welds were 100% radiographed. With a minimum yield strength of 100,000 psi, plus toughness, weldability, and high resistance to impact abrasion, USS "T-1" Steel is ideally suited for many applications throughout industry. Write for our latest booklet. United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

USS and "T-1" are registered trademarks
Hortonsphere is a registered trademark of Chicago Bridge & Iron Company

This mark tells you a product is made of modern Steel

United States Steel Corporation—Pittsburgh
Columbia-Geneva Steel—San Francisco
National Tube—Pittsburgh
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Supply—Steel Service Centers
United States Steel Export Company

United States Steel



Nose cone being removed from Wyman-Gordon-U.S.A.F. forging press.

Precision Forging of ATLAS Nose Cones

Inspection of copper nose cones at Wyman-Gordon-U.S.A.F. Plant.

When you need a large, custom-engineered die block, think of U. S. Steel first. Take this 40-ton die block shown in the final stage of forging on our 10,000-ton press. Designed by Wyman-Gordon for production of copper nose cones by closed die forging, this job received the personal attention of our metallurgists, forgers, and machinists from start to finish.

To obtain the correct hardness, our metallurgists chose a CrMoV alloy. An 85-ton electric furnace heat was then "vacuum-cast" into a 72″ diameter ingot to produce the best internal quality possible. Under the careful supervision of our forge team, the ingot rapidly assumed the final contours. As you can see, the die impression was "forged-in" with a special cupping tool for maximum toughness.

This die block was then subjected to a series of heat treatments and machining operations, closely coordinated between heat-treater and machinist, to produce maximum performance at the Wyman-Gordon-U.S.A.F. Plant. Final inspection of the rough machined block included hardness and ultrasonic testing as well as a close check of dimensions.

In addition to large die blocks such as this one, U. S. Steel makes many types of forgings—all by a team of experts. Let them handle your next order. You'll be assured of a high quality product, specifically engineered for your particular application.

USS is a registered trademark

United States Steel Corporation—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Export Company

United States Steel

USS

Wood proves Stainless Steel is simple to fabricate

General Sales Manager, C. Paul Carlson, points to the Stainless Steel milk cans designed and manufactured by the John Wood Company.

There's probably no one that has more experience and know-how with Stainless Steel fabrication than the John Wood Company. At eight different plants in the U. S. and Canada, the company makes everything from gasoline pumps to milk strainers. At their St. Paul plant they are equipped to produce 50% of the Stainless Steel can requirements for the entire dairy and dispenser industries.

The company worked closely with sanitation experts and health officials to design a Stainless Steel can that meets the strictest regulations for both material and workmanship. And at the same time, they found ways to simplify fabrication and save time and materials. They developed methods of hydraulic forming, welding, grinding and polishing that have paid off in lower costs and a quality product. These Stainless cans have a hard, durable finish that is easy to clean, ready for long, sanitary service. The John Wood Company proved that Stainless Steel isn't difficult to fabricate, it's just different.

If *you* would like to have complete information about working with Stainless Steel, write for a free copy of our *Stainless Steel Fabrication Book*. United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

USS is a registered trademark

USS

United States Steel Corporation—Pittsburgh
American Steel & Wire—Cleveland
National Tube—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Supply—Steel Service Centers
United States Steel Export Company

United States Steel

HOW MODIFIED H-P-M STANDARDS TRIPLE THE USEFULNESS OF METALWORKING PRESSES

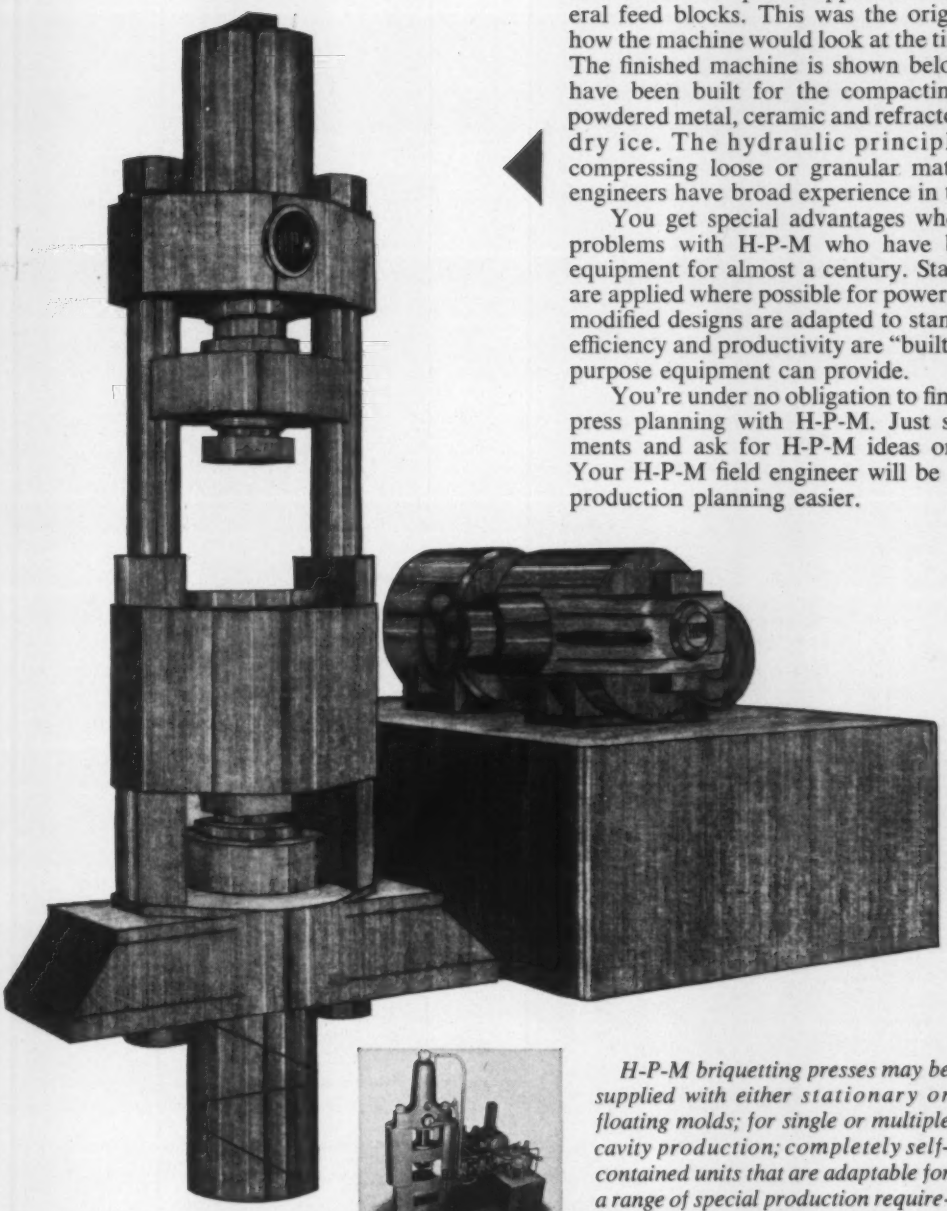
TOO CUSTOM TO CATALOG

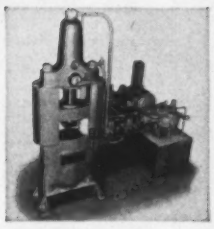
But Just Right For The Job

The unusual press illustrated at left was designed by H-P-M for the special application of briquetting mineral feed blocks. This was the original impression of how the machine would look at the time of the proposal. The finished machine is shown below. Similar presses have been built for the compacting of salt, carbon, powdered metal, ceramic and refractories, abrasives and dry ice. The hydraulic principle is the best for compressing loose or granular materials and H-P-M engineers have broad experience in this field.

You get special advantages when you place your problems with H-P-M who have built special press equipment for almost a century. Standard components are applied where possible for power and control needs; modified designs are adapted to standard press frames; efficiency and productivity are "built-in" as only special purpose equipment can provide.

You're under no obligation to find out about special press planning with H-P-M. Just send your requirements and ask for H-P-M ideas on how to build it. Your H-P-M field engineer will be able to make your production planning easier.



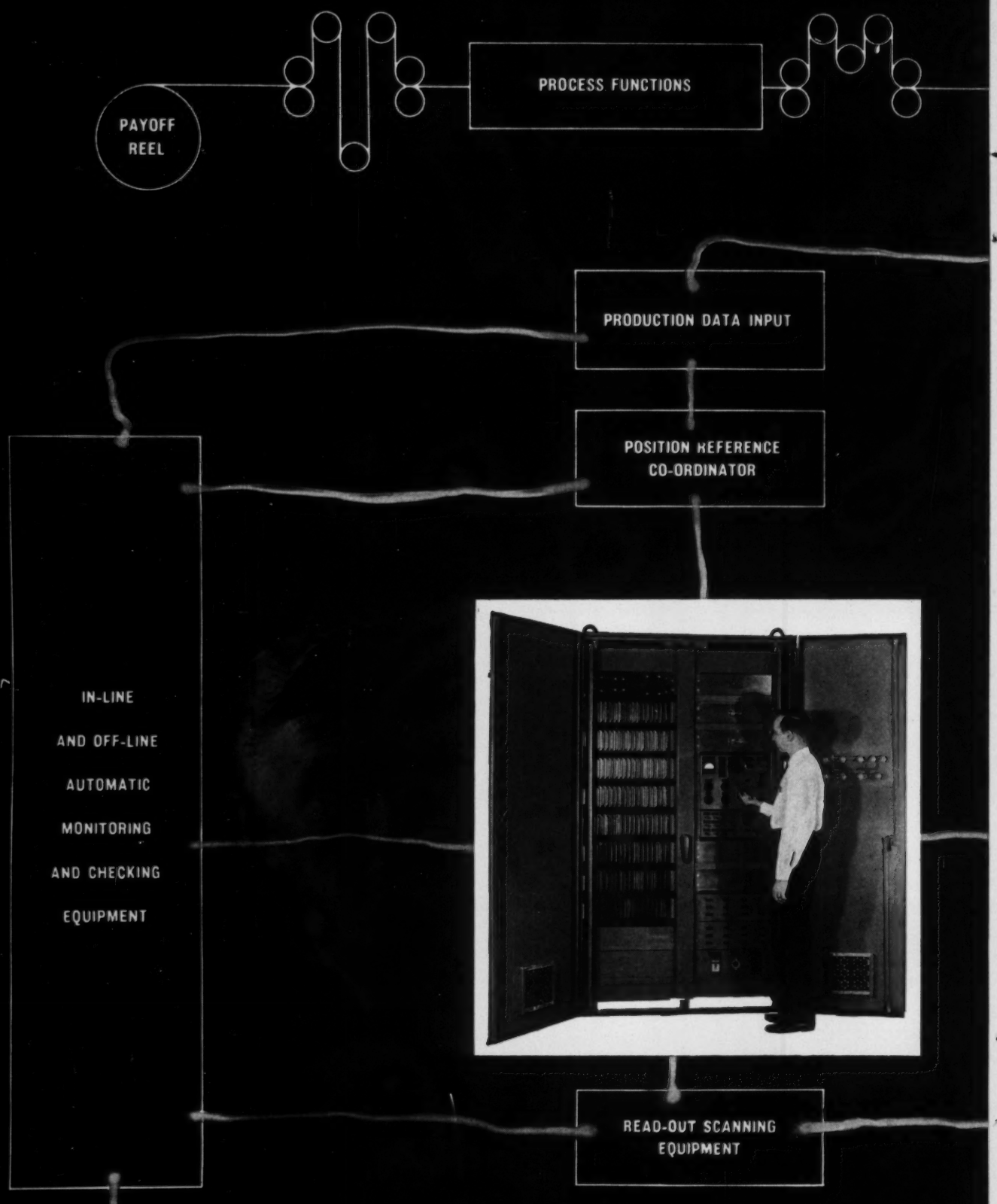


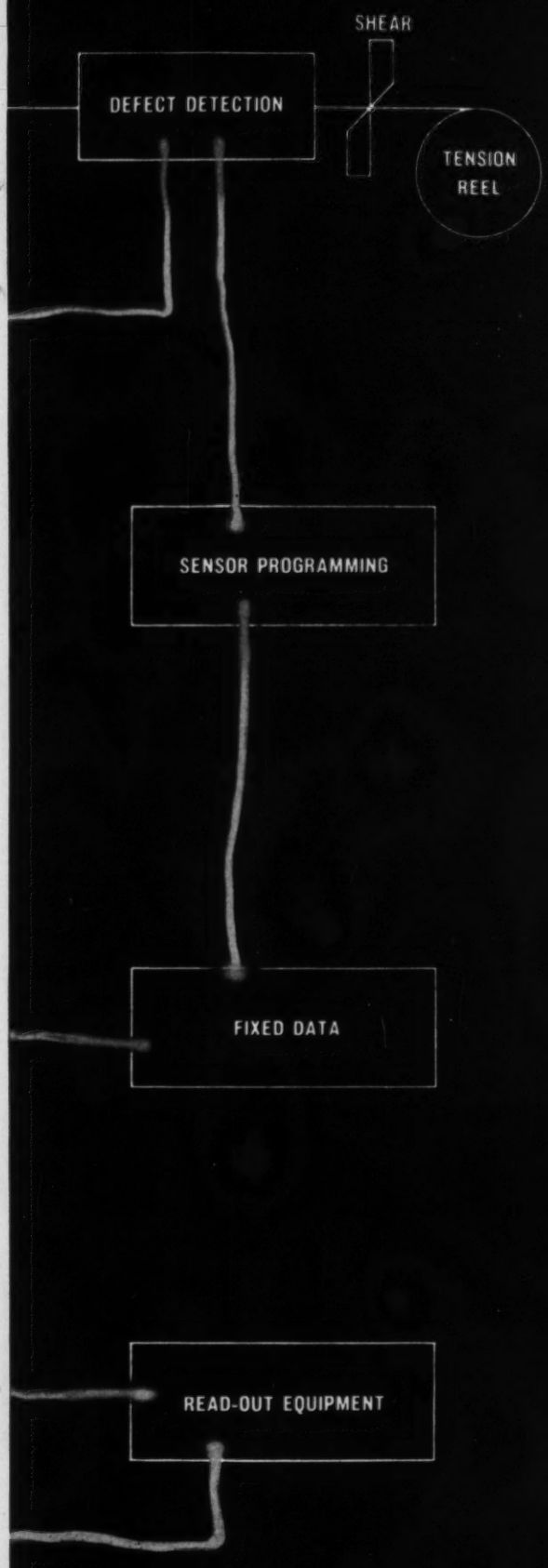
H-P-M briquetting presses may be supplied with either stationary or floating molds; for single or multiple cavity production; completely self-contained units that are adaptable for a range of special production requirements.

THE HYDRAULIC PRESS MANUFACTURING COMPANY
A Division of Koehring Company • Mount Gilead, Ohio, U.S.A.

HPM

H72


PAYOFF REEL
PROCESS FUNCTIONS
PRODUCTION DATA INPUT
POSITION REFERENCE CO-ORDINATOR
IN-LINE AND OFF-LINE AUTOMATIC MONITORING AND CHECKING EQUIPMENT
READ-OUT SCANNING EQUIPMENT



NEW!

PRODAC DATA ACCUMULATOR IS VITAL LINK IN OPTIMIZING STEEL MILL PRODUCTION . . .

Another Step in Westinghouse Progressive Automation

A large eastern steel mill has found that the completely static-design Prodac* Data Accumulator is providing continuous information and read-out of the product quality of its tin mill products. This installation is providing the basic detailed data that is a prime requisite to the ultimate automatic processing line.

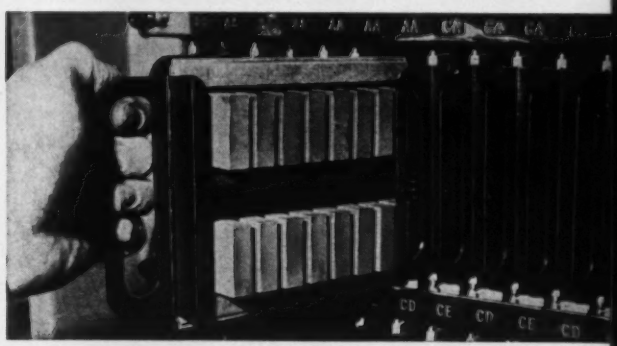
Prodac Data Accumulator Systems provide a complete record of the *product itself*. This record is a natural step in *Progressive Automation* of processing lines, rolling mills and other steel-making operations. The Data Accumulator is fully compatible with most sensing devices, electrical controls and read-out equipment.

For counsel-in-depth on steel mill drive systems application, call your Westinghouse sales engineer. He'll show you how you can economically apply step-by-step *Progressive Automation* to boost product quality, cut costs in your plant. For more information about Prodac, call Westinghouse or write: Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pa. J-96147

YOU CAN BE SURE...IF IT'S

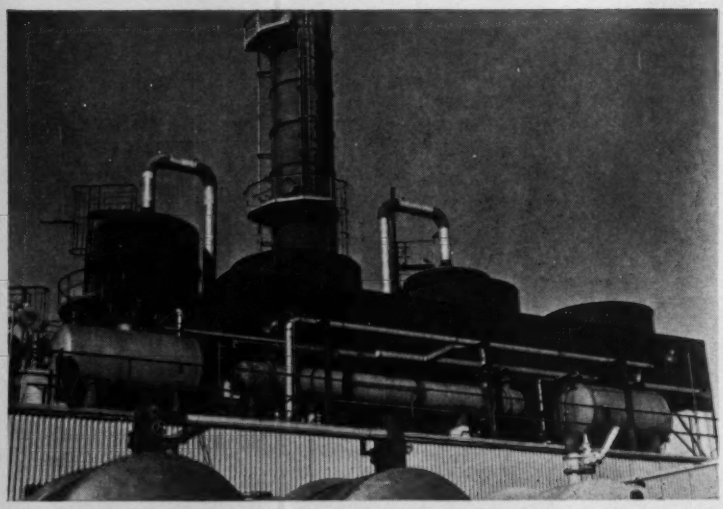
Westinghouse

TUNE IN WESTINGHOUSE-CBS TV-RADIO COVERAGE, PRESIDENTIAL CONVENTIONS, JULY 10-29

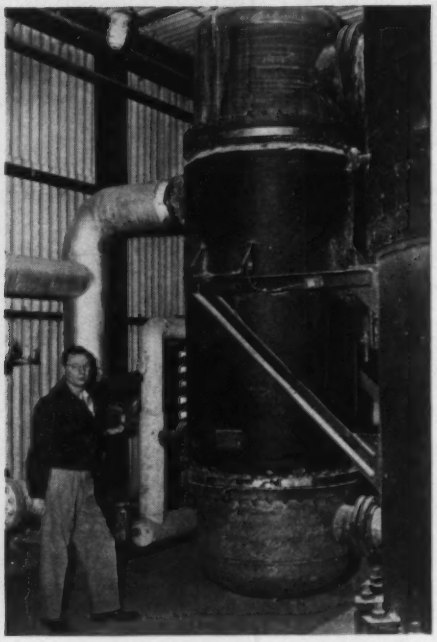


This withdrawn module represents a circuit function. It is easily accessible for removal or replacement.

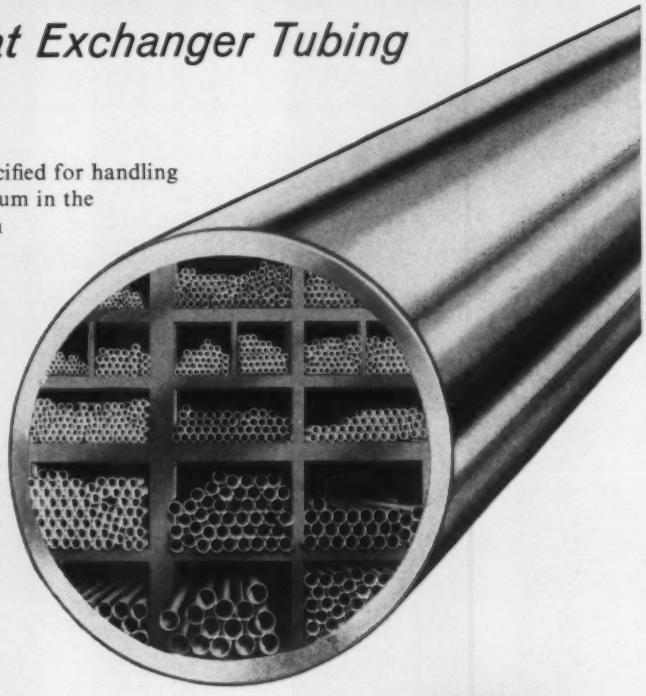
*Trade-Mark



To process acetic acid...
(240 million lbs. a year)



Carpenter Stainless Heat Exchanger Tubing



● In this case, Carpenter austenitic tubing was specified for handling acetic acid in concentrations up to 99.5%. Chromium in the steel develops a protective oxide surface film which resists corrosion. The formation of this corrosion resistant film is dependent upon a clean, smooth surface free of imperfections, dirt or scale on the tube surface. That's why dependable Carpenter Stainless Tubing . . . known for its fine *finish* as well as its other anti-corrosive characteristics . . . was used.

Carpenter Stainless Heat Exchanger Tubes meet ASTM Spec. A-249. But, more important, they must also pass the most searching non-destructive tests applied to stainless tubing anywhere. This intensive Carpenter quality control is your assurance of dependable performance and fabricating economies on any heat exchanger application.

For technical help or fast mill stock delivery, call your Carpenter representative today. The Carpenter Steel Company, Alloy Tube Division, Union, N. J.

your master key to cost-savings in chemical processing

Stainless Tubing & Pipe

Steel fabricators...

SLASH PRODUCTION COSTS INCREASE OUTPUT WITH BOULTON & PAUL FABRICATING MACHINES

MORE STEEL fabricators are turning to Boulton & Paul equipment for utmost economy in Sawing and Drilling. Cuts manpower from 27 men to 4 machine operators. See Iron Age 6th August 1959.

These composite sawing and drilling machines are made in a variety of sizes and plants are custom-built to suit individual requirements.

If you haven't yet had your copy of "Steelwork by Automation" write to us for addresses of agents in the U.S.A. and elsewhere.

DESIGNED AND BUILT
BY FABRICATORS
FOR FABRICATORS!

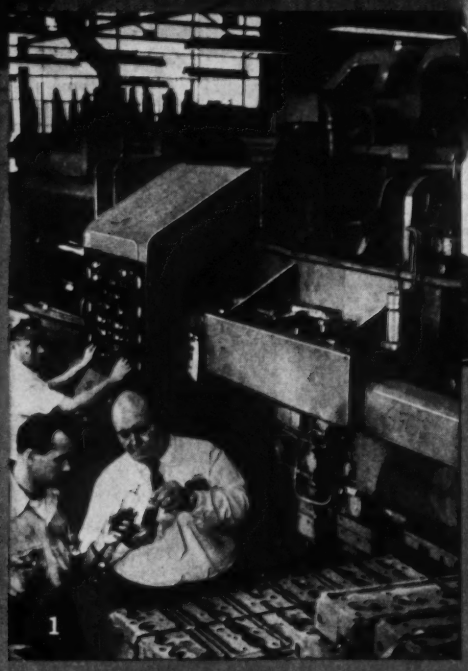
Our Customers include:
International Steel Company
Mississippi Valley Structural Steel Company
Yuba Erectors, Division of Yuba Consolidated Industries Inc.
Dominion Bridge Company Limited
Banister, Walton & Company Limited
Edward Wood & Company Limited
Matthew T. Shaw & Company Limited
P. & W. MacLellan Limited
Moreland, Hayne & Company Limited
Shelton Iron & Steel Limited
A. J. Main Limited
T. C. Jones Limited

BOULTON AND PAUL

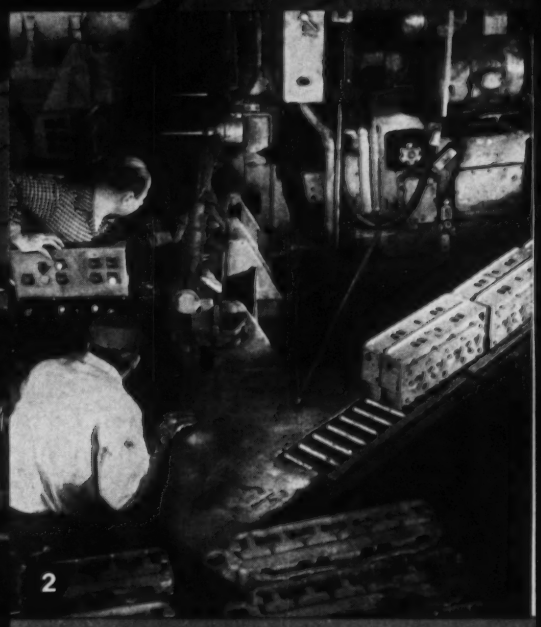
Boulton & Paul Limited STRUCTURAL ENGINEERS NORWICH ENGLAND

HOW
MOBIL
HELPS

American Motors set



1

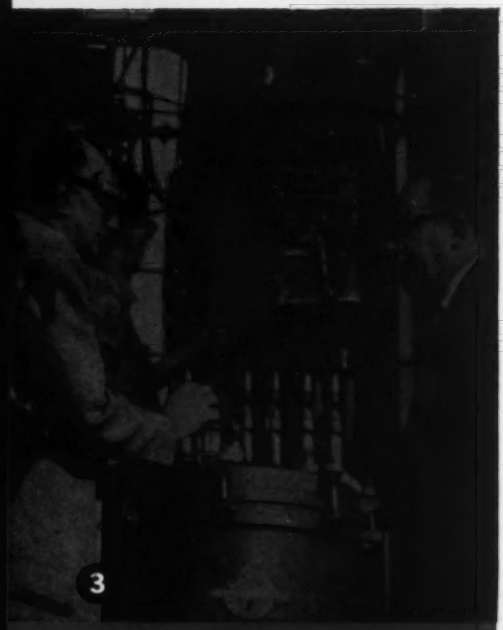


2

"The popular demand for Rambler Automobiles has resulted in sharply increased production requirements for our division. To keep our equipment running at capacity we have worked closely with Mobil Oil Company. This effort has been completely justified and has saved us considerable money."

MR. R. E. ANDERSON, *Superintendent, Motor Division, American Motors Corp.*

production records!



1. An annual change of hydraulic oil was once the rule for this large machine which broaches top and bottom of cylinder heads. Mobil engineers felt oil usage could be extended, performed periodic analyses that showed oil could be used three years. Examining oil sample is Anthony Belasich, Assistant Superintendent.

2. This "transfer line" machines cylinder heads. Subsequent washing operations were hampered by excessive "soaping" of the cleaner. Mobil traced the trouble to the cutting oil then in use... recommended an equally effective, but less costly product that solved the problem.

3. To meet production schedules, American Motors runs its engine division 24 hours a day at full capacity. Overload caused frequent breakdowns on the critical transfer machines that drill and ream 6-cylinder blocks. Mobil recommended a correct heavy-duty lubricant, suggested periodic filtering of lubricant and hydraulic oil. Stoppages were drastically reduced. Discussing filtering procedure are Rudy Nalberg, Assistant Superintendent and Frank Zuerner, Mobil Representative.

American Motors Plant at Kenosha, Wisconsin, fills increased production demands... reduces downtime... cuts labor and material costs!

Keep 'em coming! That's the order of the day for Rambler Automobiles, and production stoppages can be disastrous. When American Motors' far-sighted management anticipated production demands that would greatly exceed rated plant capacity, they promptly went about making preparations. Mobil was called in to insure correct lubrication for the highly critical production machinery in the motor division.

Mobil engineers, working in close cooperation with American Motors personnel, analyzed the lubrication problems posed by this record output . . . studied other problem areas as well. They recommended correct heavy-duty products, effective preventive maintenance procedures, techniques to reduce contamination and prolong lubricant life. As a result, machine downtime was greatly reduced, production availability sharply increased, and direct dollar savings to American Motors were achieved.

If you are interested in how Mobil may help you solve lubrication problems in your plant, call your nearest Mobil representative. Or write: Mobil Oil Company, 150 East 42nd Street, New York 17, New York.

Mobil

CORRECT LUBRICATION

MOBIL OIL COMPANY, 150 East 42nd Street, New York 17, N. Y.

HOW DO YOU MEASURE

GROWTH?

Increased plant size is certainly one sure indication. The Landis Machine Company began operations in 1903 in a building having only 7600 square feet of floor space—represented by the color area.

Today, by comparison, the plant is a sprawling giant measuring nearly 400,000 square feet of floor space. In addition, the Landis plant in Canada includes 10,900 square feet. During the last 6 years we have continued to grow—through building 40,000 square feet of additional facilities in Waynesboro—the purchase of Maiden and Company, Ltd. in England—and an immediate expansion of 17,000 square feet at Maiden.

But mere physical size is not the only indication of growth. There are other indications, perhaps less tangible, but just as important. Maturity is one. Sincerity is another. And maybe the most important of all is Responsibility.

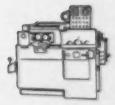
Landis is proud that it has "grown-up" not only in ways that show in figures and statistics, but also in ways that show in a friendly smile, a sincere hand-shake, and the willingness to accept the responsibility for customer satisfaction. These non-statistics are just as important to the people at Landis as graphs and charts; and, for over 50 years, they've proved to be important to our friends and customers.

For assistance or information on any phase of threading production or equipment, call or write Landis—The World's Largest Manufacturer of Threading Equipment.

LANDIS *Machine* COMPANY

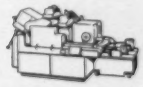
WAYNESBORO • PENNSYLVANIA

THE WORLD'S LARGEST MANUFACTURER OF THREADING EQUIPMENT

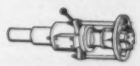


Thread Rolling Machines

Thread Rolling Tools



Centerless Thread Grinding Machines



Taps—Collapsible & Solid Adjustable

Die Heads—Rotary & Stationary

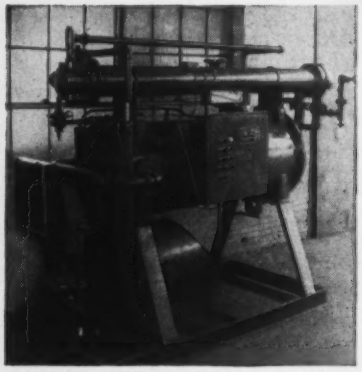
Threading Machines

MMT-PE

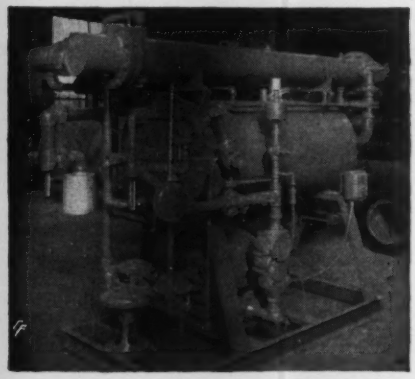
BOOTH NO. 432

556C

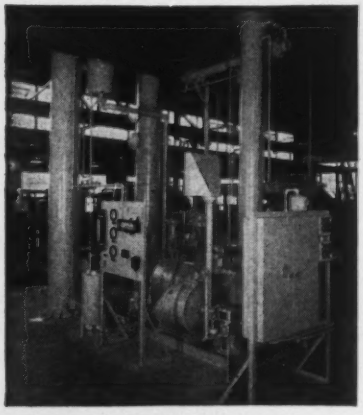
Which of these 3 KEMP GAS GENERATORS *can you use in your plant?*



1 KEMP INERT GAS GENERATOR
—for working non-ferrous metals. Produces inert gases for use at low or high pressure, desiccated or unprocessed. Kemp gives you low-cost gas generation, completely automatic operation. Premixing in exclusive Kemp Carburetor and constant analysis assures highest thermal efficiency.



2 KEMP ATMOS GAS GENERATOR
—for working low-carbon steels. For gases low in carbon dioxide. As in all Kemp Gas Generators, test burner permits checking for proper combustion characteristics before igniting burners. Another safety feature: automatic fire-checks guard against flashback.



3 KEMP NITROGEN GENERATOR
—for working high-carbon steels. Completely eliminates CO_2 from gas, produces 99+% nitrogen. Features the easy start-up typical of all Kemp Generators. Vernier dial can be locked in position to maintain exact fuel-air ratio without further control manipulation.

The Kemp representative in your area can advise you on the type and size of generator to best solve your problem. Talk to him or write: THE C. M. KEMP MANUFACTURING COMPANY, 405 E. Oliver St., Baltimore 2, Maryland.

It always pays to come to

KEMP OF BALTIMORE

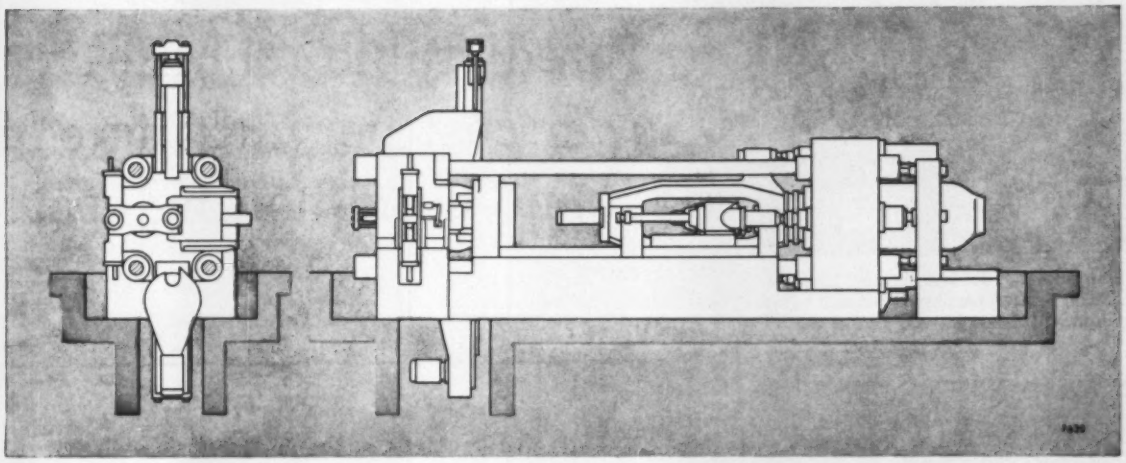
THE C. M. KEMP MANUFACTURING COMPANY
405 E. Oliver St., Baltimore 2, Md.

SCHLOEMANN
ROLLING MILLS · HAMMERS · PRESSES

New Extrusion Presses

SCHLOEMANN extrusion presses of new, improved design are the result of intensive research and development work. New features have been introduced in both the press units for rods and tubes and the auxiliary equipment including the power station. These new features, combined with carefully designed controls permitting automatic programming, offer substantial savings in operation.

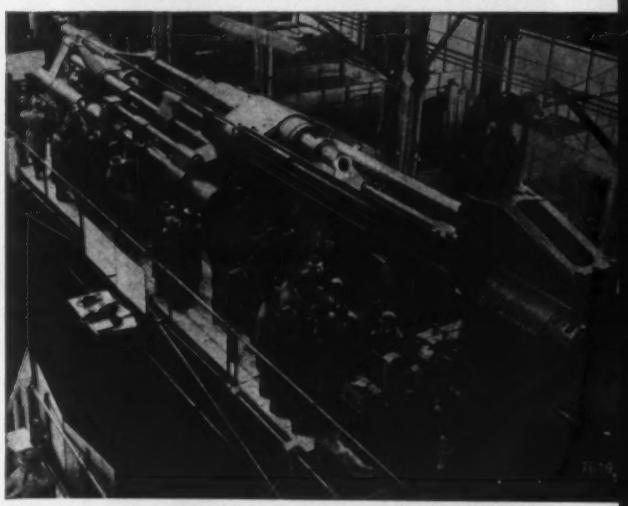
You are invited to contact us for complete information on these presses.



Horizontal extrusion press for non-ferrous metals with rotary die head and internally-arranged piercer.

Features and advantages

- Good accessibility to the press and tools through effective arrangement of the columns, tie-bars and guideways, and through a long-stroke container shifting device.
- Simple and quick tool changing through a rotary die head, die changer and quick-action locking arrangements.
- Speedy removal of the extrusions by severing behind the die. (Axial displacement of the die).
- Compact design of the press and efficient mandrel guidance through an internally-arranged mandrel manipulator or piercer with mandrel stroke adjuster, mandrel stroke limiter, relative stroke mechanism and mandrel turner.
- Improved quality of extrusions and longer tool life through the incorporation of cooling arrangements for the billet container, die and mandrel.



Inspecting a 2750-ton extrusion press of the four-column type, with rotary die head, demonstrated under workshop conditions on the occasion of the SCHLOEMANN Congress held at the MAN plant at Nuremberg.

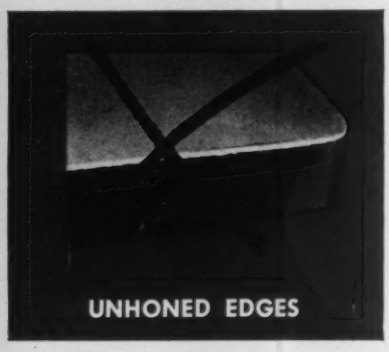
FELLER ENGINEERING COMPANY 1190 Empire Building, Pittsburgh 22, Pa.

Metallurgical Memo from General Electric

GENERAL ELECTRIC ANNOUNCES PRE-HONED

Hand-honing is inaccurate, time-consuming—often results in premature chipping and breaking.

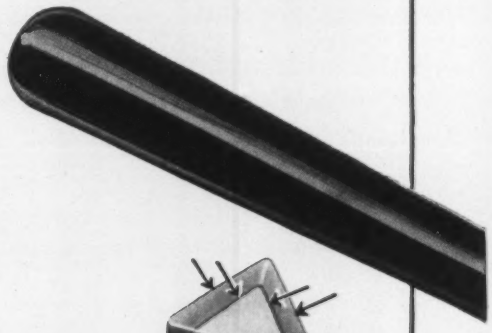
Chamfered, or ground-flat, edges are geometrically weaker than a radius and are more easily chipped or broken.



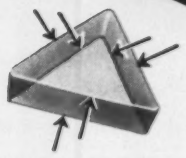
Unhoned or as-ground inserts show rough edges—result in unpredictable tool life due to chipping.

Now you get more predictable tool life... lower cost per cutting edge ... no hand-honing cost!

Pre-honed inserts with uniform, precise honed edges offer top strength; improve tool life predictability.



Additional savings result through the elimination of costly and often inaccurate hand-honing methods.



Because chipping and breaking are minimized, pre-honed Carboloy inserts result in lower average cost per cutting edge.

TOPS IN TOOLING QUALITY

From the research and quality-control facilities of the Metallurgical Products Department of General Electric comes the outstanding quality tooling line in the metalworking industry. The new Carboloy pre-honed inserts, as well as the complete line of Carboloy toolholders, inserts, insert seats, convertible seats, and brazed tooling, are designed to meet every tooling need efficiently and economically.

CARBOLOY® INSERTS

Delivered ready-to-use . . . honed to a precise radius . . . promise BETTER PROFITS THROUGH BETTER TOOLING

Now General Electric Carboloy inserts are pre-honed *at the factory!* Here's what it means to you:

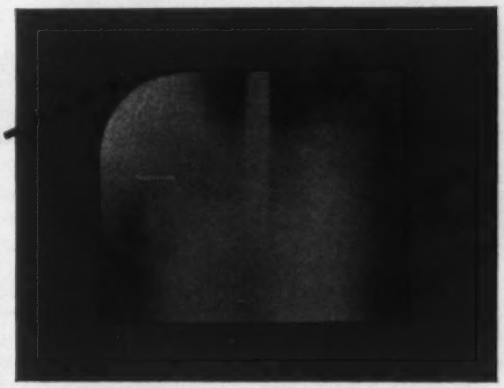
1. An insert with edges honed to precise *radii* gives the strongest geometric shape to withstand cutting pressures. This reduces the chance of chipping—increases the predictability of tool life. Hand honing *cannot* achieve precise radii—G-E pre-honing can . . . and does!

2. Since chipping is minimized, fewer cutting edges are wasted. The result is lower cost per cutting edge.

3. Since inserts come pre-honed and ready-to-use, the labor cost and inaccuracies of hand honing are eliminated. This more than offsets the additional charge for pre-honing.

4. Pre-honed Carboloy cemented carbide inserts have standard edge radii honed to a greater or lesser degree, depending on the job to be done. You'll *know* the honing is right!

Ask your Authorized Carboloy Distributor about pre-honed Carboloy inserts, convertible seats, toolholders, and brazed tools. Or, write directly to: *Metallurgical Products Department of General Electric Company, 11153 E. 8 Mile Ave., Detroit 32, Michigan.*



Shown here, both under magnification and graphically, is an edge of the new Carboloy pre-honed insert. Radius is geometrically ideal to minimize chipping, extend tool life many times.

CARBOLOY®
CEMENTED CARBIDES

METALLURGICAL PRODUCTS DEPARTMENT

GENERAL ELECTRIC

CARBOLOY® CEMENTED CARBIDES • MAN-MADE DIAMONDS • MAGNETIC MATERIALS • THERMISTORS • THYRITE® • VACUUM-MELTED ALLOYS

SANDVIK

Keeps A *Scientific* Eye On

SPRING STEEL QUALITY

Control of steel purity. The SANDVIK laboratories carry out more than 200,000 chemical analyses a year.

Research microscope for up to 2,000X enlargements. This microscope is also used for the study of structures, control of heat treatments, macrophotography etc.

At Sandvik, the latest scientific research and quality control techniques constantly improve and protect spring steel quality.

This is part of the reason why Sandvik steels have the special physical stamina to give consistent performance in such critical applications as flapper valves, instrument springs, shock absorbers, surgical instruments, unbreakable watch mainsprings, piston ring segments and expanders, etc.

Sandvik stocks a wide variety of grades and sizes of cold rolled specialty strip steels. For information on leading types, send for this free brochure.

SANDVIK STEEL, INC.

1702 Nevins Road, Fair Lawn, N. J.
SWarthmore 7-6200 • N.Y.C. ALgonquin 5-2200
Branch Offices:
Cleveland • Detroit • Chicago • Los Angeles
SANDVIK CANADIAN LTD.
P.O. Drawer 1335, Sta. O, Montreal 9, P. Q.
Works: Sandviken, Sweden

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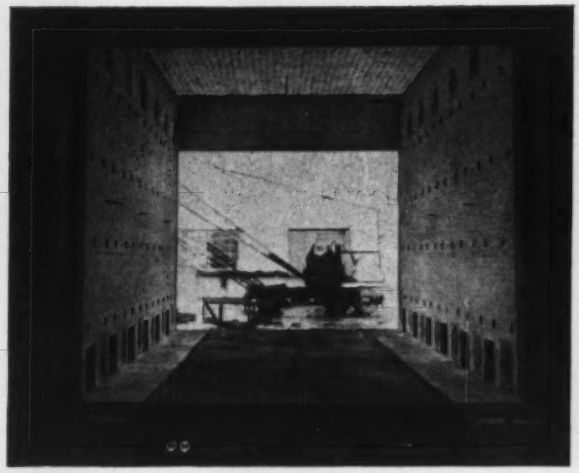
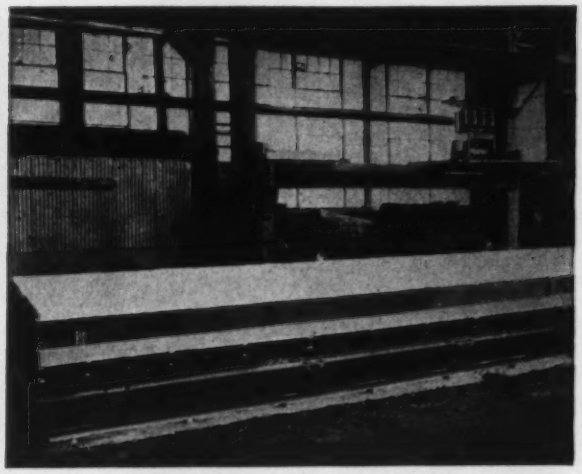
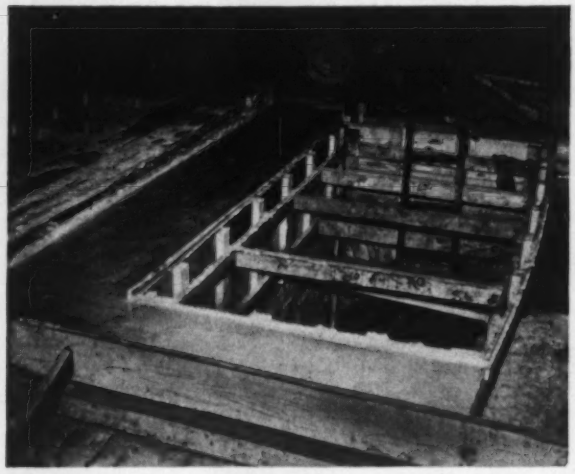


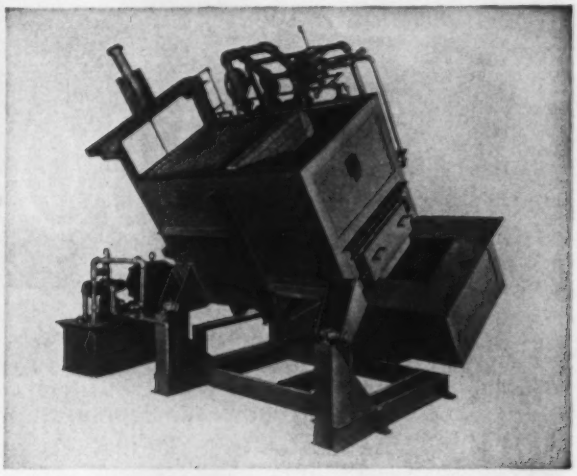
In this stress-relieving furnace, B&W Kaocrete-D is used on the floor ledges, car top, in the door jamb and at the end of the flat roof where it withstands the abrasion of the door. This material is specially designed to withstand severe abrasive conditions and mechanical abuse.



Heavy duty car top service requires a high strength castable. B&W Kaocrete-D is excellently suited for this service at temperatures to 2500 F. B&W Kaocrete-32 is recommended for service above this range.



B&W Kaocrete-32 has been cast to form the curb walls of a soaking pit. When mechanical abuse from ingots damages the curb, Kaocrete-32 has the necessary properties to localize the damage, thus maintaining the serviceability of the rest of the curb.



The castable lining of this aluminum reverberatory furnace must have unusually high strength to withstand the considerable physical abuse of charging, operating and cleaning, while resisting the penetration of the molten metal. Kaocrete-D is widely used in this application.

How B&W refractory castables solve abrasion problems

Refractory castable linings used in metal-working furnaces are often subjected to severe mechanical abuse. Scraping by hand tools, loading and unloading, and the action of the molten metal and particle-laden gases all affect the life of refractories. Among B&W's line of refractory castables are two that are particularly suited to withstand unusual abrasive conditions. They are B&W Kaocrete-D and B&W Kaocrete-32, both of which have been used successfully in many demanding applications.

B&W Bulletin R-35A gives additional information on versatile B&W refractory castables. Write for copy to The Babcock & Wilcox Company, 161 East 42nd Street, New York 17, N.Y.

R606R

B&W THE BABCOCK & WILCOX COMPANY

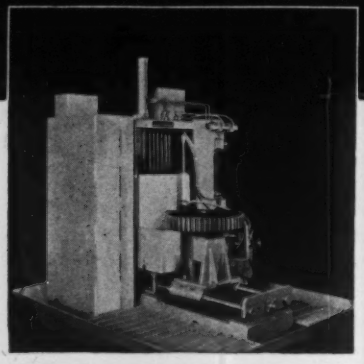
REFRACTORIES DIVISION

B&W Firebrick, Insulating Firebrick, and Refractory Castables, Plastics, Ramming Mixes, Mortars, and Ceramic Fiber.

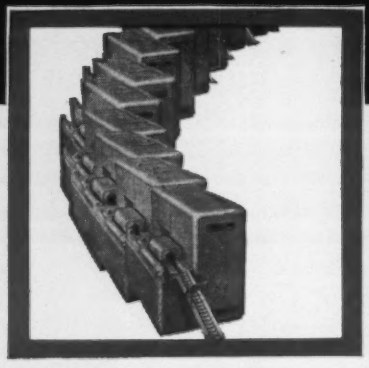
we like to be close to our customers...

and future customers!

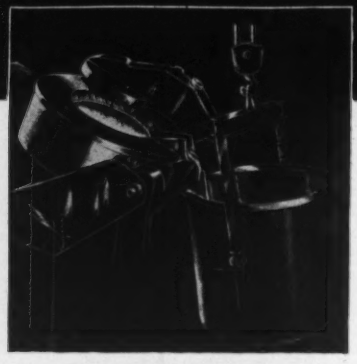
Ajax Magnethermic Representatives are located in major market areas. You will find the telephone number of the office in your area on the opposite page. Whether you want information on an application, or service on an existing installation, the Ajax Magnethermic man can give you assistance. He knows induction heating and melting.



HEAT TREATING . . . AM makes Induction heat treating equipment for either high production or job shop operation. Shown above—the versatile gear hardener . . . heat treats 6" to 60" diameter gears.



BILLET HEATING . . . Press the button, that's all! The AM Billet Heater delivers a billet at exact temperature to the extrusion or forging press.



MELTING . . . AM supplies all types of Induction Melting Furnaces including: core, coreless, lift and automatic pouring, vacuum and degassing.

AJAX Magnethermic CORPORATION

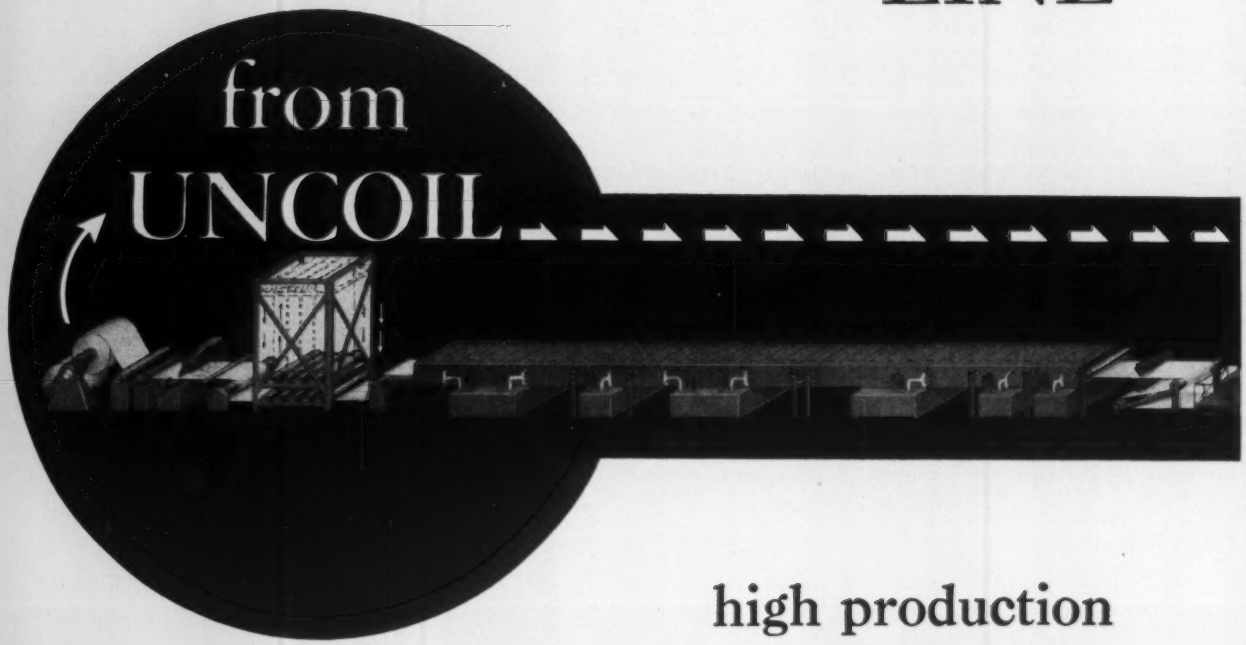
induction heating is our only business!

GENERAL OFFICES
P. O. BOX 839
Youngstown 1, Ohio

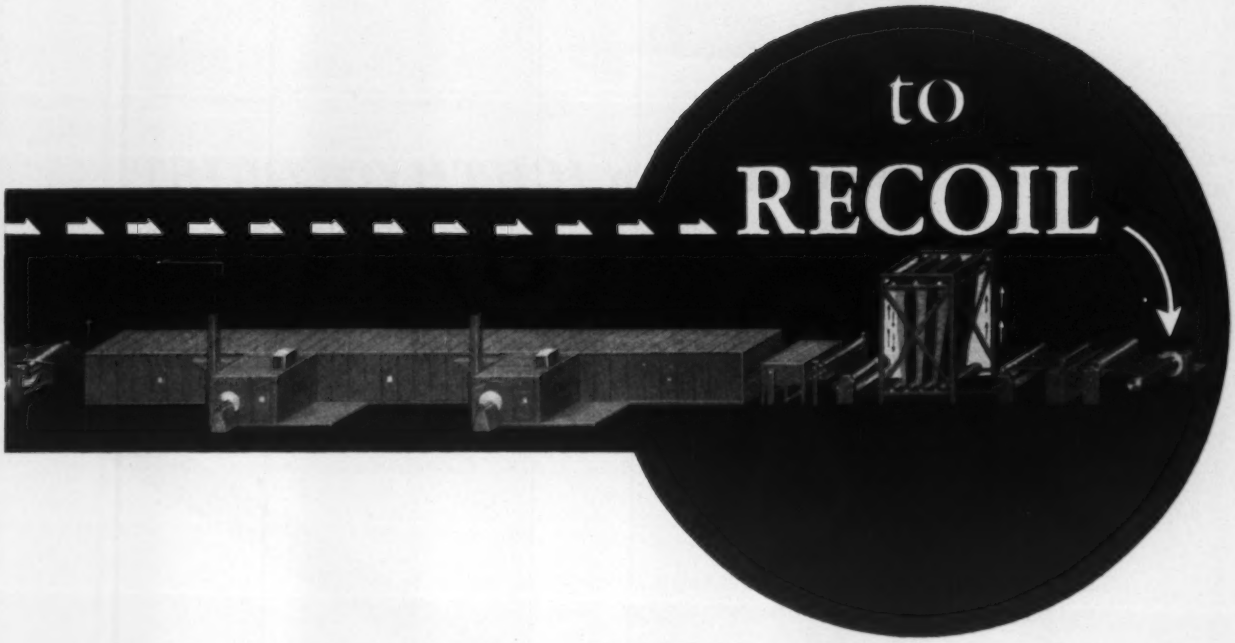
TRENTON DIVISION
930 Lower Ferry Road
Trenton 5, New Jersey

YOUNGSTOWN DIVISION
3990 Simon Road
Youngstown 1, Ohio

THE ROSS/WALDRON STRIP COATING LINE



high production machinery for quality coating of aluminum and steel strip



Selecting a Ross/Waldron Strip Coating Line for aluminum, steel, tin plate or any other metal means you have a *single source* responsible for the complete line. Every piece of actual processing equipment is made to the same uniformly high specifications. There are no weak links. Result? Less down-time—more production and the highest quality.

Write for Bulletin RW-500, or our reprint entitled "Continuous Coating of Aluminum or Steel Strip."

M-R
MIDLAND-ROSS CORP.

J. O. ROSS ENGINEERING
WALDRON-HARTIG
DIVISIONS OF MIDLAND-ROSS CORPORATION
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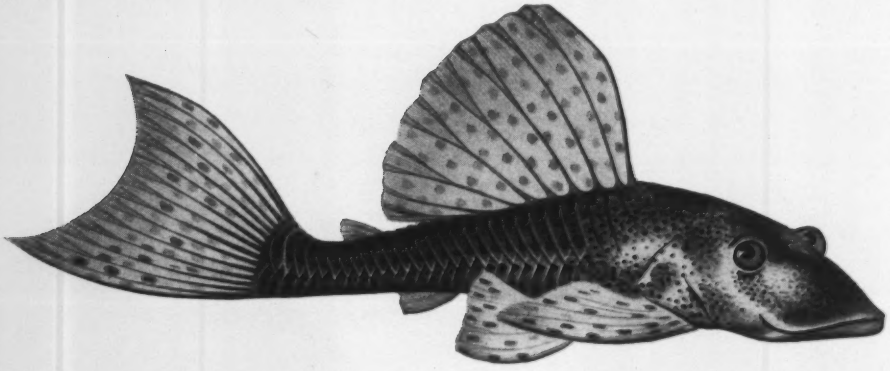
ATLANTA • BOSTON • DETROIT • LOS ANGELES • SEATTLE • MT. PROSPECT, ILL.

To identify a strange fish...



you call in an *ICHTHYOLOGIST*

(specialist in fish life)

to cut production costs...

you call in *LINCOLN*

(specialists in arc welding)

BECAUSE of high operating costs a Maryland barge builder had trouble meeting competitive prices. The LINCOLN Field Engineer recommended a semi-automatic "Squirt" welder. On heavy plate it was four times faster and reduced overall costs due to reduced plate preparation and cleaning time.

As a matter of fact, right there is a good reason for doing business with LINCOLN. Cost reduction is a sort of religion at LINCOLN where production costs have dropped as much as 50% in the last 20 years. It's the result of LINCOLN'S world-famous cooperation between employees and management where everybody gets paid according to his own contribution to the company's goal—superior products and service to you at continually decreasing costs.

That's why we say it's a good idea to do business with LINCOLN where arc welding is a specialty and cost reduction comes to you as a "plus" at no charge.

To learn how LINCOLN can be of service to you, write today

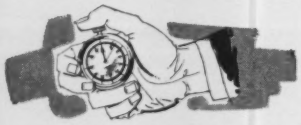
THE LINCOLN ELECTRIC COMPANY

Dept. 1910 • Cleveland 17, Ohio

LINCOLN WELDERS

Field reports prove that the powerful, new Gardner-Denver impact mechanism hits harder—yet doesn't wear itself out. See for yourself.

New Gardner-Denver impact wrenches hit harder . . . last longer



TIME TO TALK COST SAVING

When you keep in touch with your Gardner-Denver air tool specialist, you keep in touch with the latest developments in new methods and machines to cut costs. At Gardner-Denver, there's no substitute for men—our growth philosophy as we enter our second century of service.

Now get efficient impacting for maintenance, production, plant construction, etc., with two new impact wrenches that hit harder—yet don't wear themselves out. They're the result of intensive Gardner-Denver engineering to develop a powerful, long-lasting impact mechanism. The combination of a fast-accelerating air motor and a new, patented clutch mechanism assures powerful, efficient impacting and lowest maintenance.

And look at these advantages: light weight—lowest weight possible consistent with high power output . . . ease of disassembly for service . . . no torque reaction . . . reversing lever protected from accidental engagement, but readily accessible when needed.

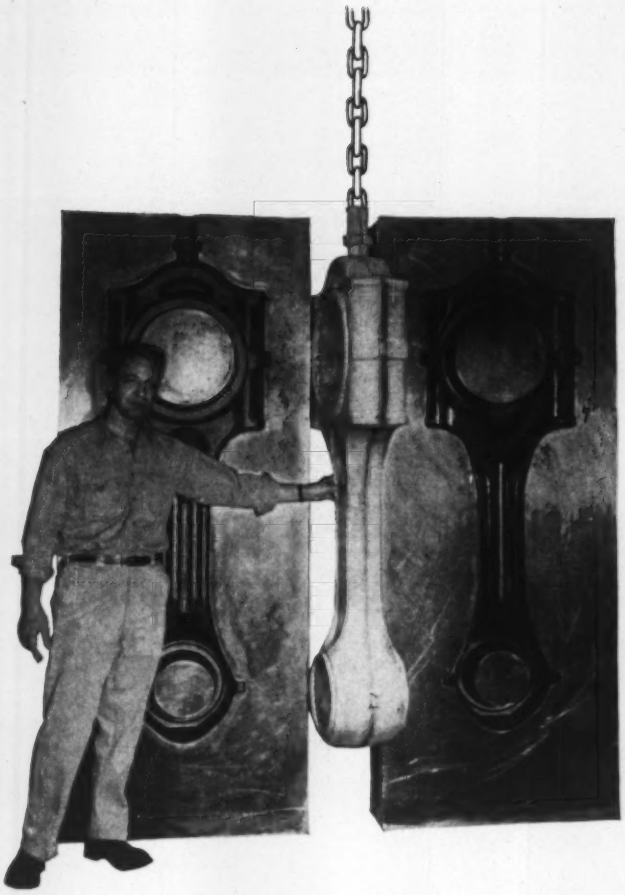
Two models available: Model 18-B-9 with 1¼" rated bolt capacity . . . Model 18-B-7 with ¾" rated bolt capacity. Get all the details from your Gardner-Denver air tool specialist or write for Bulletins 18-15 and 18-11.

EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

GARDNER - DENVER

Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Ave., Toronto 16, Ontario



you get planned high quality closed die forgings... in 5 pounds or 5000

The forging dies you see here are used to produce compressor connecting rods weighing 1250 lbs. The plaster cast shown is for verifying dimensional accuracy.

Size is not a factor. Park's consistent high quality and competitive price stem not only from facilities . . . but *techniques*.

Park's answer to your questions could settle your problem once and for all. Call us . . . and we'll be glad to talk them over.

3034-PD

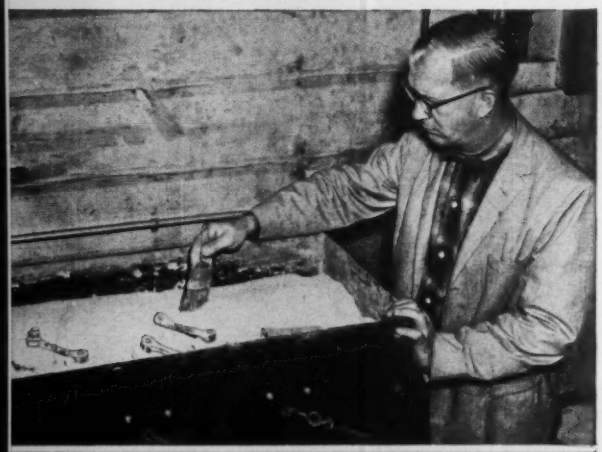
the park drop forge co.

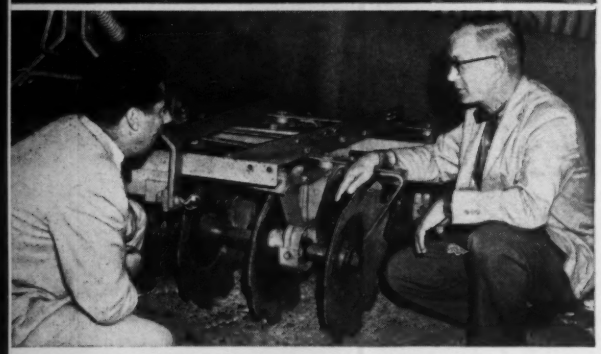
777 East 79th St., Cleveland 3, Ohio

pf

Allis-Chalmers uses **RYKON** *Grease in bearing shield—offers farmers better disc harrow*

can **RYKON** Grease help you improve your product?





Above: Maynard Walberg sweeps sand back over disc harrow bearings on test stand. RYKON Grease is undergoing 2,000-hour test in this simulation of actual farm service conditions.

Below: Allis-Chalmers disc harrow ready for shipment from the plant gets inspection from Standard's Fred Parkinson and Walberg.

Maynard Walberg, Allis-Chalmers project engineer, and Standard Oil lubrication specialist Fred Parkinson, examine disc harrow bearing assembly. Fred is well equipped through training and experience to help industrial customers with lubrication problems. He has been doing this work for 11 years at Standard. He has a degree in chemistry and engineering from Brown University. Plus that, he has completed the Standard Oil Sales Engineering School.

Situation: Bearings of a disc harrow in service are always turning in dusty conditions, oftentimes completely covered with soil. Such bearings in the Allis-Chalmers harrow are protected with grease-coated rubber shields. The grease guards against dirt getting past the shield and into the bearing.

What was done: Allis-Chalmers project engineer in the LaCrosse, Wisconsin plant, Maynard Walberg, called Fred Parkinson, Standard Oil lubrication specialist, for a sample of RYKON Grease. In conditions simulating field service, RYKON Grease was tested. Bearings were rotated in the most abrasive dirt available—Mississippi sand with a high quartz fraction.

What happened: Tests were started and run to destruction. Prior to the use of RYKON Grease, bearing failures occurred at 500 hours. On switching to RYKON Grease, these tests were pushed to 2,000 hours. At this point, tests were stopped. Bearings were still in operating condition.

What you can do: Find out how RYKON Grease might help you offer your customers a better product. Inquire of the Standard Oil lubrication specialist nearest you anywhere in the 15 Midwest or Rocky Mountain states. Or write **Standard Oil Company (Indiana), 910 So. Michigan Ave., Chicago 80, Ill.**

STANDARD

You expect more from STANDARD and you get it!

Quick facts about RYKON

- Heat stable. At sustained high temperatures RYKON Grease remains soft and grease-like.
- Resistant to water-washing.
- Mechanically stable. Minimum change in consistency in service.
- Resistant to oxidation. Thickener acts as an inhibitor.
- Exceptional rust-preventive properties.

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springs

and other things

custom-made to quality standards

Answer your "where to get it" questions– by calling on the versatile experience represented by these typical springs and stamped parts. Here is unusual ability to analyze your part from both design and production efficiency and to make cost-saving contributions where possible. Whether your requirements are large or small, routine or extreme precision, you'll get a better brand of service and quality from the best springmakers in the business.

Send for "Pocket Guide to Springs and Other Things" —a quick picture of our products and services.

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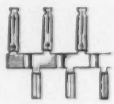
Stampings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6003

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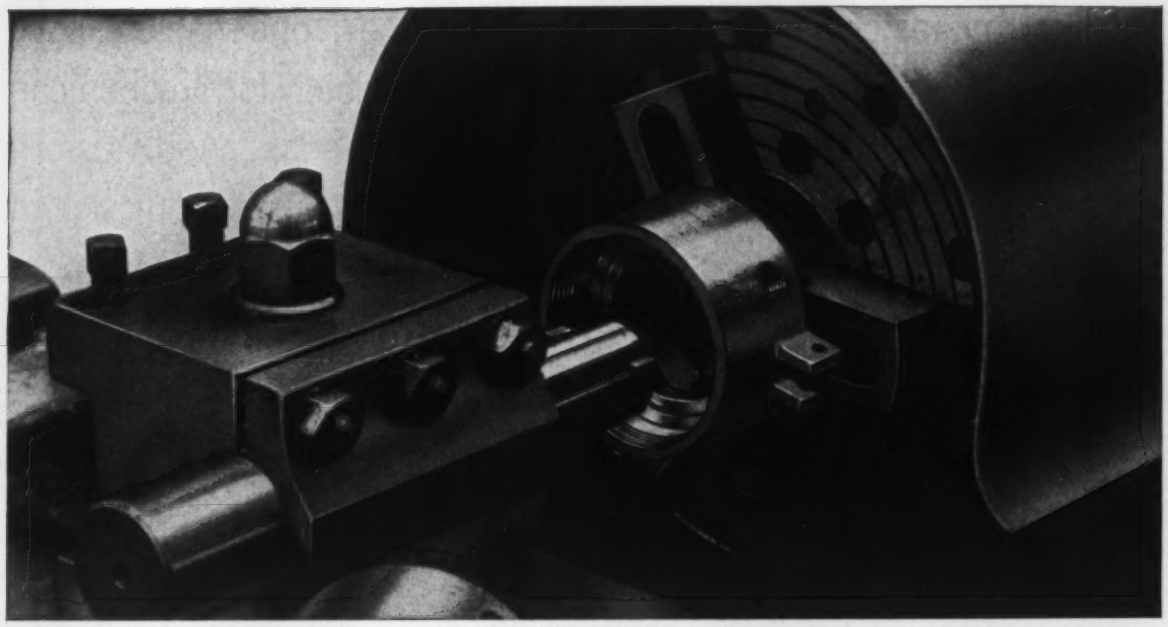


Threaded in just 6 seconds on a Gisholt CRI-DAN

Here's a good example of what you can do on a Gisholt CRI-DAN Threading Lathe—an internal thread, $2\frac{3}{16}$" diameter x $\frac{1}{4}$" long, 12 t.p.i., cut in a phosphor-bronze bearing housing in just six seconds.

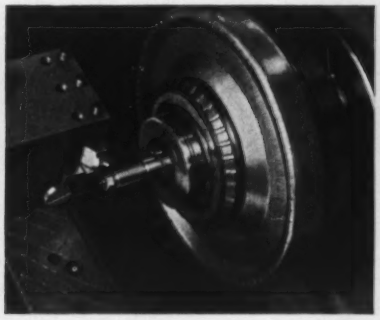
Speed and versatility obsolete other methods.

Note the other jobs shown—the variety of work and the fast threading times. Simple on a CRI-DAN—yet, each presented problems that could only be solved at high cost using any other method.

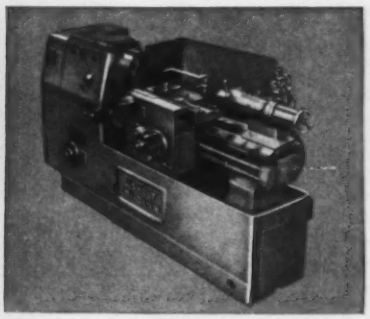
It's Cri-Dan for highest quality, lowest cost.

The jobs shown here prove that close tolerance and high-quality finish requirements are met easily on the CRI-DAN. The CRI-DAN method, using an inexpensive single-point carbide tool, is faster and less costly than thread grinding or thread milling.

20 seconds—Zoom operating sleeve for movie camera; aluminum; I.D. pilot dia. bored; tool indexed for threading a 2-start, .0625-pitch, .125"-lead, Class 4 16NS thread in the 1.610" center section.



15 seconds—spinning roller; stainless steel; 18 t.p.i. thread on $\frac{5}{8}$" diameter for $\frac{7}{8}$" length.



GET THE FACTS—NOW! Two models are available—both are capable of handling high-production work or a wide variety of short-run jobs. Change-over averages ten minutes. Write for our catalog—or ask your Gisholt Representative for complete details.

GISHOLT® MACHINE COMPANY

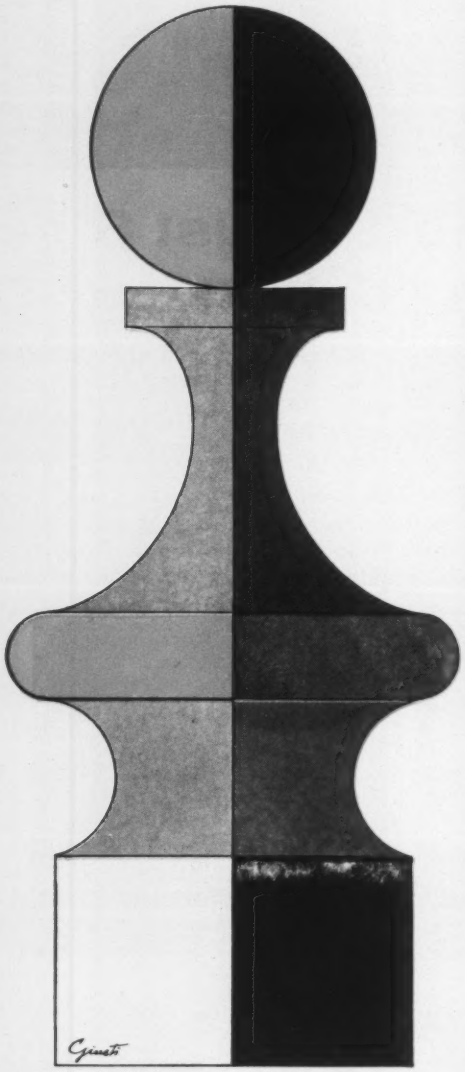
Madison 10, Wisconsin

Investigate Gisholt's Extended Payment and Leasing Plans

MMT=PE

Turret Lathes • Automatic Lathes • Balancers • Superfinishers • Threading Lathes • *Factory-Rebuilt Machines with New-Machine Guarantee*

You'll form it faster with Western Brass because... one machine pass can take you from brass strip or sheet to a completely formed pen cap, hose coupling, lighter case, lamp base or similar shape. And Western Brass offers a special advantage. Users will tell you that our skill in annealing and rolling actually gives them more strip per dollar... more good parts per pound. You'll make it better with ductile, formable brass. You'll make it best with "tailor-made" Western Brass.



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Western BRASS

PLANNED MASS-HANDLING

Your immediate attack against rising costs

YOU NEEDN'T WAIT TO SEE RESULTS! Towmotor fork trucks have the power and capacity to make your savings a matter of record—from the very first day of operation. You get noticeable advantages in Towmotor engineering—in new features that enable the Towmotor "one-man-gang" to get more work done at much lower cost. Write for case studies that show you how companies similar to yours are reducing costs through more effective handling operations. TOWMOTOR CORPORATION, CLEVELAND 10, OHIO.

RENT or LEASE

your Towmotor-Gerlinger equipment. Increase profits without tying up working capital. For information contact Towmotor-Gerlinger Rental Division, Towmotor Corporation.

FORK LIFT TRUCKS, CARRIERS AND TRACTORS SINCE 1919

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Gerlinger Carrier Co. is a subsidiary of Towmotor Corporation

COMBINATION STARTERS IN SPIN-TYPE ENCLOSURES

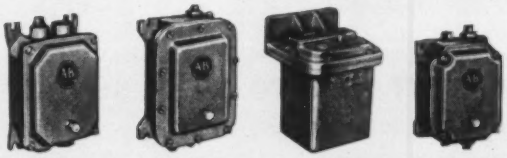
Here's Allen-Bradley's Bulletin 713 combination starter with circuit breaker—featuring conveniently removable spin-type cover and base—for use in hazardous gas and dust locations. Inside you'll find the time-tested A-B Bulletin 709 solenoid starter.

The consistent reliability of Allen-Bradley solenoid starters is a result of their design simplicity. With only ONE moving part, there's virtually nothing to go wrong—this is your assurance of millions of trouble free operations. In addition, the double break, silver alloy contacts are *always* in perfect operating condition—and remain so with *no* service attention. Also, all A-B starters have two permanently accurate thermal relays that protect motors against dangerous overloads. The reliability of these relays is not affected by atmospheric conditions or the length of time in service.

To insure maximum production with minimum maintenance, insist on Allen-Bradley *quality* motor control. Please write for full information.

Cutaway of Enclosure
Shows Allen-Bradley combination starter. Screw-type cover and base permit quick access to the starter or the circuit breaker.

A-B Bulletin 713
Combination Starter



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Watertight
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Dust Locations

These enclosures remain available. Because of the trouble free operation of Allen-Bradley control, bolted covers are not a problem.

Allen-Bradley Co., 1341 S. First St., Milwaukee 4, Wis. In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

ALLEN-BRADLEY
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Quality Motor Control

What HORACE DREVER has to say about Lindberg heat treating equipment

Mr. Horace Drever, internationally prominent in the industrial heating field, is a Past-President of the Furnace Manufacturers Association and President of Drever Company, furnace manufacturers and commercial heat treaters.

QUOTE from Mr. Drever's unsolicited letter to Lindberg Engineering Company

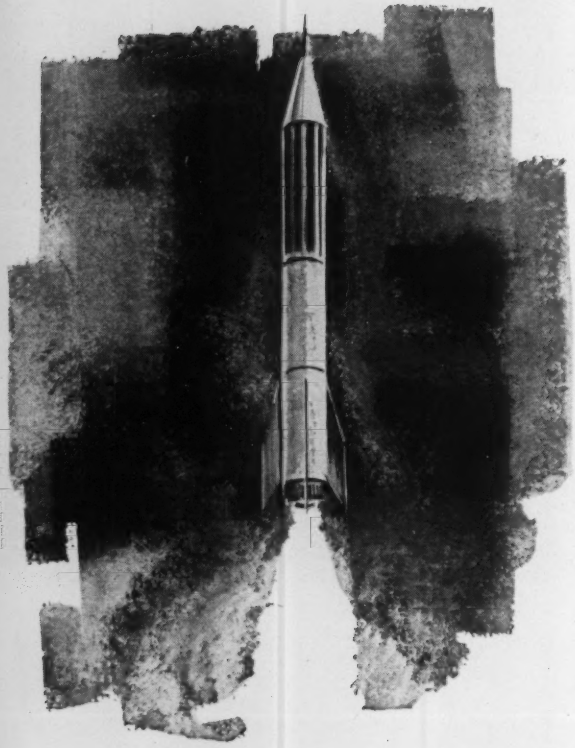
"For the past three and one-half years, we have been operating one of your Type 243618 GVRT Furnaces along with a 500 CFH Lindberg Hyen generator in our commercial heat treating division. We are extremely pleased, not only with the fine quality of work turned out by this equipment but also its relatively trouble-free operation. As evidence of our complete satisfaction we have ordered another Lindberg Furnace of this type."

DREVER COMPANY

Lindberg Furnaces in operation at the Drever Company, Bethayres, Pennsylvania.

We are happy that Mr. Drever, a furnace manufacturer in his own right, originally chose Lindberg equipment for his heat treating plant and that its satisfactory service prompted an additional order. The second Lindberg Furnace is now in production at Drever Company, as the adjacent photo shows. Bless those satisfied customers! If you have a product or process in the metal or ceramic field requiring the application of heat you can depend on Lindberg's engineering and design know-how to provide exactly the right equipment to answer your need. Get in touch with your nearest Lindberg Field Representative (see classified phone book) or write direct to Lindberg Engineering Company, 2452 West Hubbard Street, Chicago 12, Illinois. Los Angeles plant: 11937 South Regentview Avenue, Downey, California. In Canada: Birlefco-Lindberg, Ltd., Toronto.

LINDBERG
heat for industry



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from missiles to mowers . . .

Sheffield has the right bolts

The world is so full of things. And so many of them are made with bolts. From rockets that shoot for the moon, to mowers that trim the lawns of suburbia. The list is next to endless.

Meeting the many different needs for steel bolts takes a lot of doing. Sheffield does it with one of the world's largest bolt plants, staffed by an expert team of specialized bolt metallurgists, engineers, research and quality control men.

All of which means you can be sure of quick delivery of all your bolt needs, in any quantity, for any job, from a single source. Whether it's standard or special bolts — or bolts custom-made to your specifications — you can be sure of getting the right bolt, right on time, from Sheffield. Just call your Sheffield Man.

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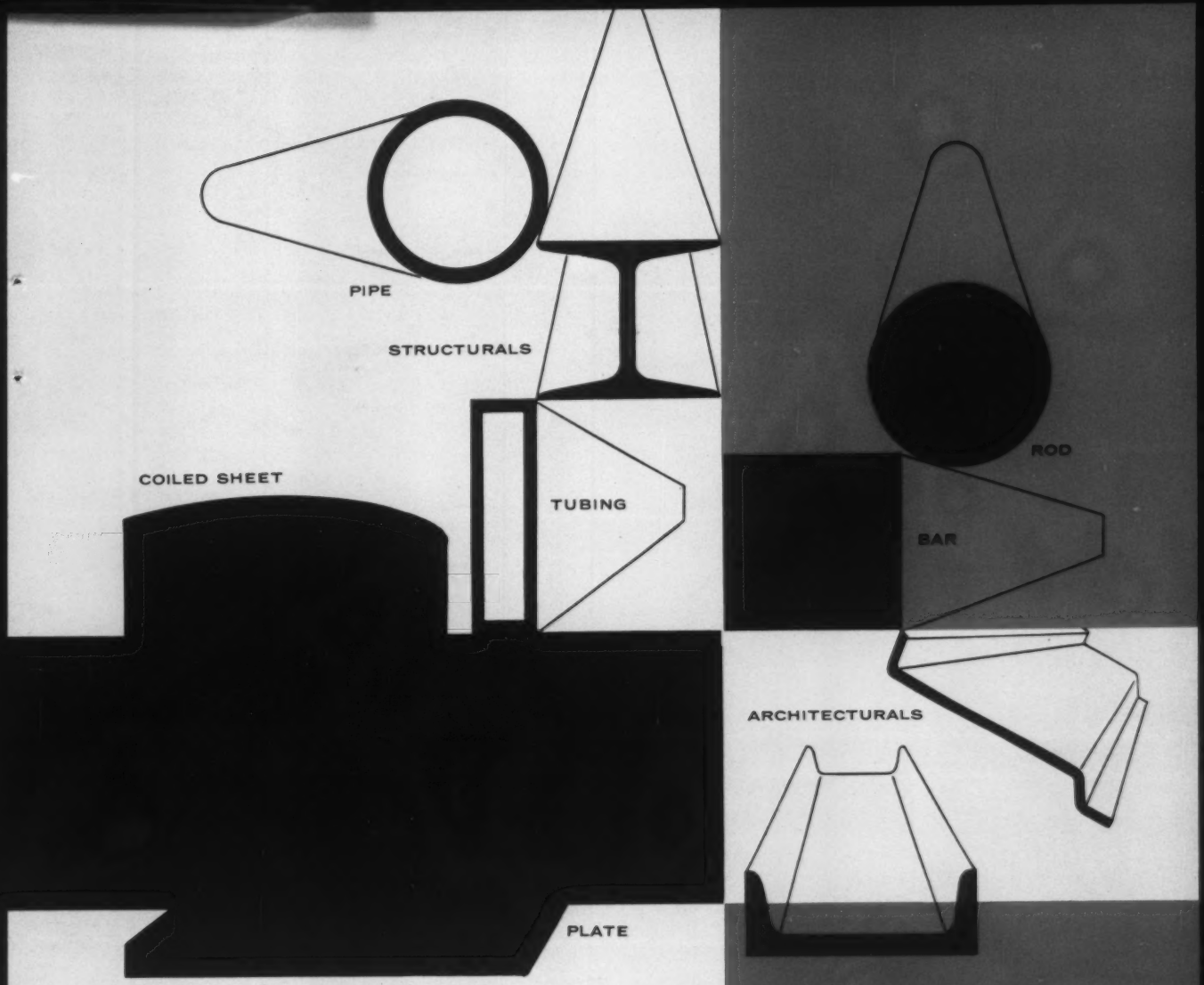
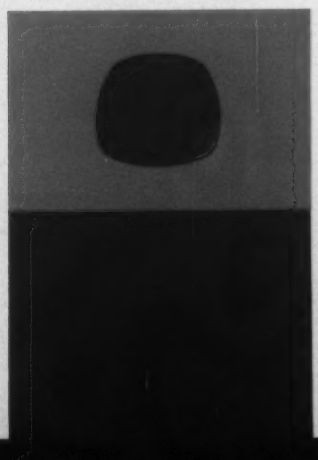


aluminum savings ...and service



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Your Reynolds Distributor stocks the aluminum most in demand in your area—and he can get it to you fast. He can offer sound, cost-cutting technical advice, as well.

Remember, he saves you inventory space by stocking major forms of aluminum at *one* source. He represents aluminum know-how and economy. Phone him today!

REYNOLDS METALS COMPANY
Richmond 18, Virginia

See next page for list of distributors →

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for aluminum, aluminum service, aluminum economy

(he's listed under "Aluminum" in your classified phone book)

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Globe Iron Construction Co., Inc., *Norfolk (Architectural)
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Washington Roofing Products Co., Inc.,* (Architectural)
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High quality electronic drive. ¾–10-hp. Wide speed range. Small, lightweight. General Purpose and High Performance types. Write for Bulletin GEA-7018 and GEA-7019*.

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General Electric adjustable-speed drives are available for every performance level, every price range to help you boost output, improve quality, increase machine flexibility, reduce installation costs, cut your maintenance budget, add substantial profits to your business.

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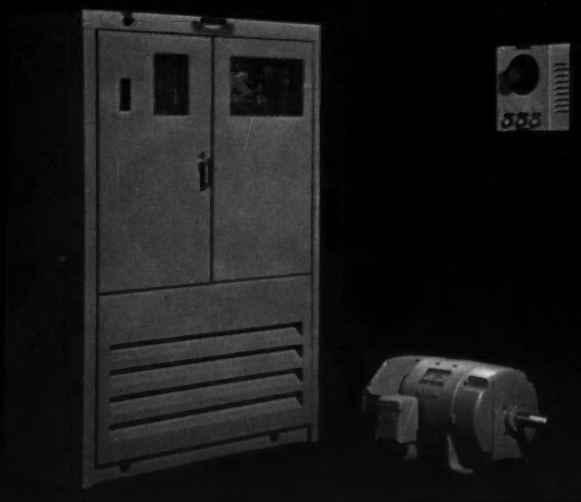

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Power amplistat conversion features hermetically sealed silicon rectifiers. 1–200-hp. Speed ranges to 200:1. Lightweight, quiet and vibrationless. Field proven. Write for Bulletin GEA-7012*.

** Write to Section 821-4, General Electric Company, Schenectady 5, New York.*

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In product research, G.E. invests more than three times the industry average. You benefit from the most modern features in your G-E drive.

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To learn more about the modern capabilities of G-E packaged drives and components, call your nearby General Electric sales engineer. ADJUSTABLE SPEED, a new booklet which outlines G.E.'s complete line of modern packaged adjustable-speed drives, is also available to help you modernize for profits. Ask for Bulletin GEA-6999*.

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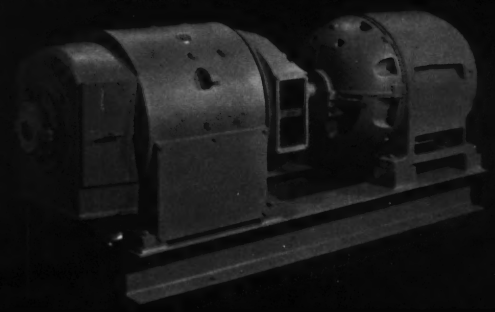
HEAVY DUTY M-G SETS

Reliable power conversion for main, auxiliary and process line drives



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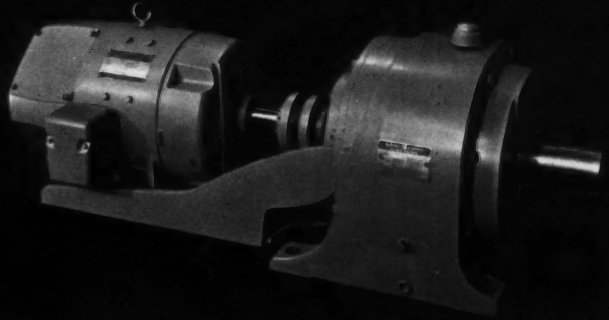
A-c or d-c. 1 to 75-hp. Simplified maintenance. Produced by Gear Motor & Transmission Components Dept. Write for Bulletin GEA-6704*.



In this fine contemporary AMERICAN stainless tableware

quality begins with

Superior STAINLESS STRIP STEEL

Excellent formability—giving the designer free range for creative styling ... ever-bright luster for lifetime beauty ... stay-new appearance, always! These SUPERIOR Stainless qualities are backed by *responsibility in depth* to our customers—for precise uniformity in coil to coil, dependable deliveries, broad technical service. Write us on *your* stainless needs.

The stainless tableware pictured is manufactured by ONEIDA SILVERSMITHS, Oneida, N. Y.

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There's more to the car of tomorrow than just futuristic styling! Automotive engineers are working constantly to perfect completely new power plants—like turbine engines—to achieve yet unheard of performance and economy! And they demand bearings that are as advanced as their thinking. This is no new challenge to Bower engineers. Their many original contributions have helped increase performance and reduce bearing failure to a minimum. If your product is one which requires advanced bearings today plus realistic planning for the future, call Bower. There's a complete line of tapered, straight, or journal roller bearings for every field of transportation and industry. Bower Roller Bearing Division, Detroit 14, Michigan.

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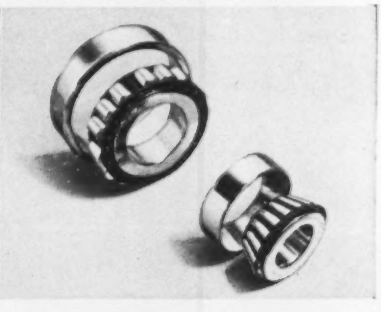
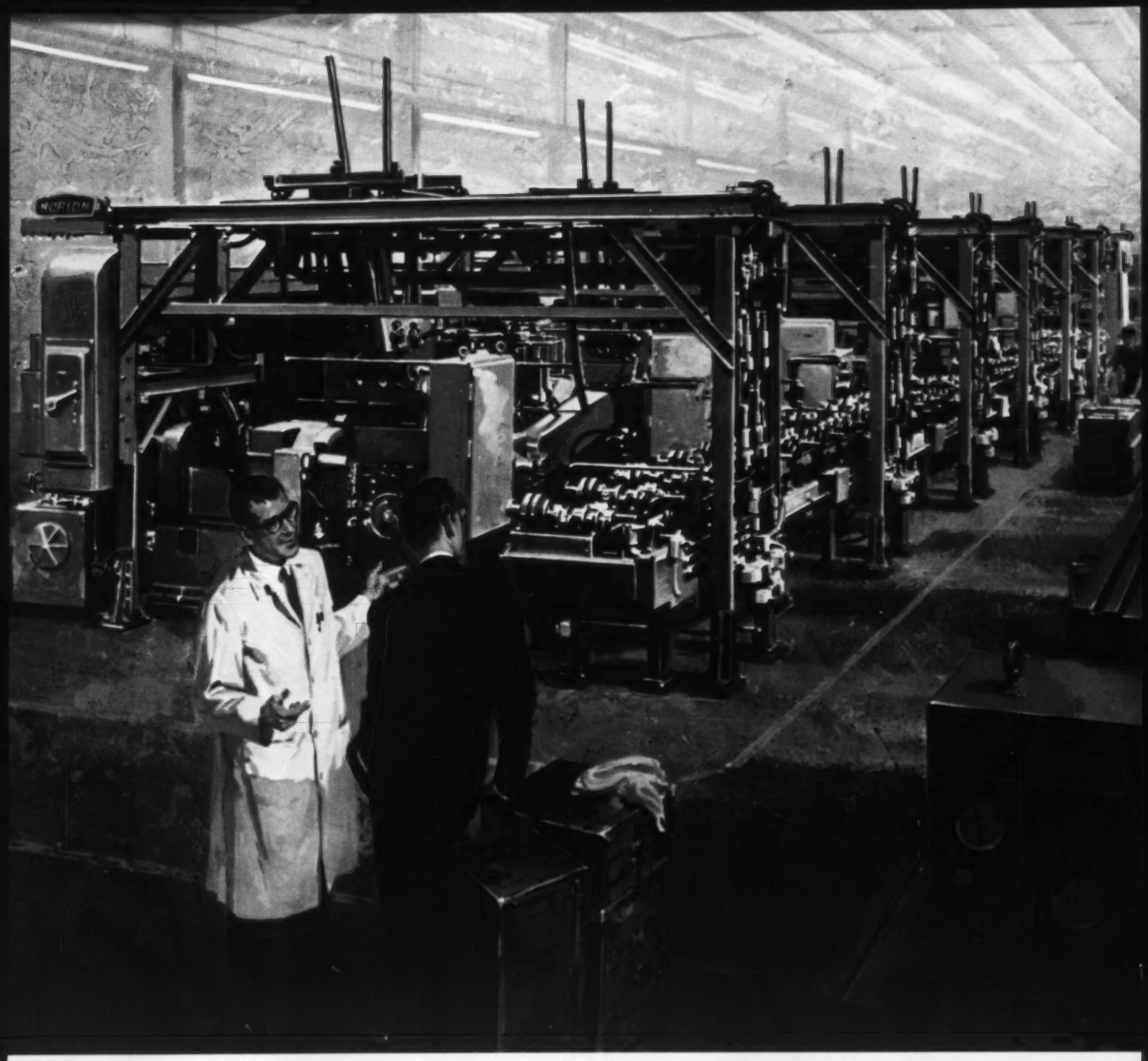
*ROUND-THE-CLOCK DEPENDABILITY is one reason why the petroleum industry specifies Bower roller bearings.

LEADING HEAVY EQUIPMENT MANUFACTURERS use Bower roller bearings—for long, efficient life under punishing loads.

REDUCE BEARING MAINTENANCE—Use Bower tapered and cylindrical roller bearings for your application.





And now . . .
Norton Automatic Transfer Machines Multiply the "Touch of Gold"

The new Norton Transfer Type Crankshaft Grinder is actually many cylindrical grinders in one . . . in which adjusting, controlling, gaging, transferring and all other manual operations have become fully automatic! Once again the Norton "Touch of Gold" aids in mass-producing . . . swiftly, accurately, economically.

To the development of grinding machines — ranging from the smallest and simplest to the largest and most complicated — Norton brings the longest and broadest experience. See your Norton Man about putting this experience to work for you.

NORTON COMPANY, Machine Tool Division, Worcester 6, Mass.

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75 years of . . . Making better products . . . to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories • Electro-Chemicals — **BEHR-MANNING DIVISION:** Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes
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Four giant double-width Buffalo Fans cooling mill motors of a well-known West Virginia steel plant.

Mill motor cooling requires a high-capacity installation that will keep delivering continuously — (sometimes millions of cfm) like the above battery of Buffalo Type "BLD" Fans. In jobs of this size and importance, fan strength and stamina are of the essence. Fan failure could shut down a mill. And handling such large volumes of air makes fan efficiency a major consideration.

On all counts, Buffalo Fans measure up. *Buffalo* heavy steel plate housings; strong steel plate wheels with massive hubs, heavy back plates, wheel flanges and die-formed blades provide the rigid strength required. *Buffalo* directional inlet vanes, bell inlet with matching dished wheel flange and backward curved blades provide the smoothest possible air passage through the streamlined housing — for highly stable performance and efficiency that conserves driving power.

Whether you need dependable mill motor cooling, sintering, draft or mill ventilation, investigate the "Q" Factor* of superior design and construction that makes *Buffalo* your best fan buy. Write us concerning your air job, or contact your nearby Buffalo Engineering Representative.

**The "Q" Factor — the built-in Quality which provides trouble-free satisfaction and long life.*

"Buffalo"

BUFFALO FORGE COMPANY

BUFFALO, NEW YORK

Buffalo air handling equipment to move, heat, cool, dehumidify and clean air and other gases.

Buffalo Machine Tools to drill, punch, shear, bend, slit, notch and cope for production or plant maintenance.

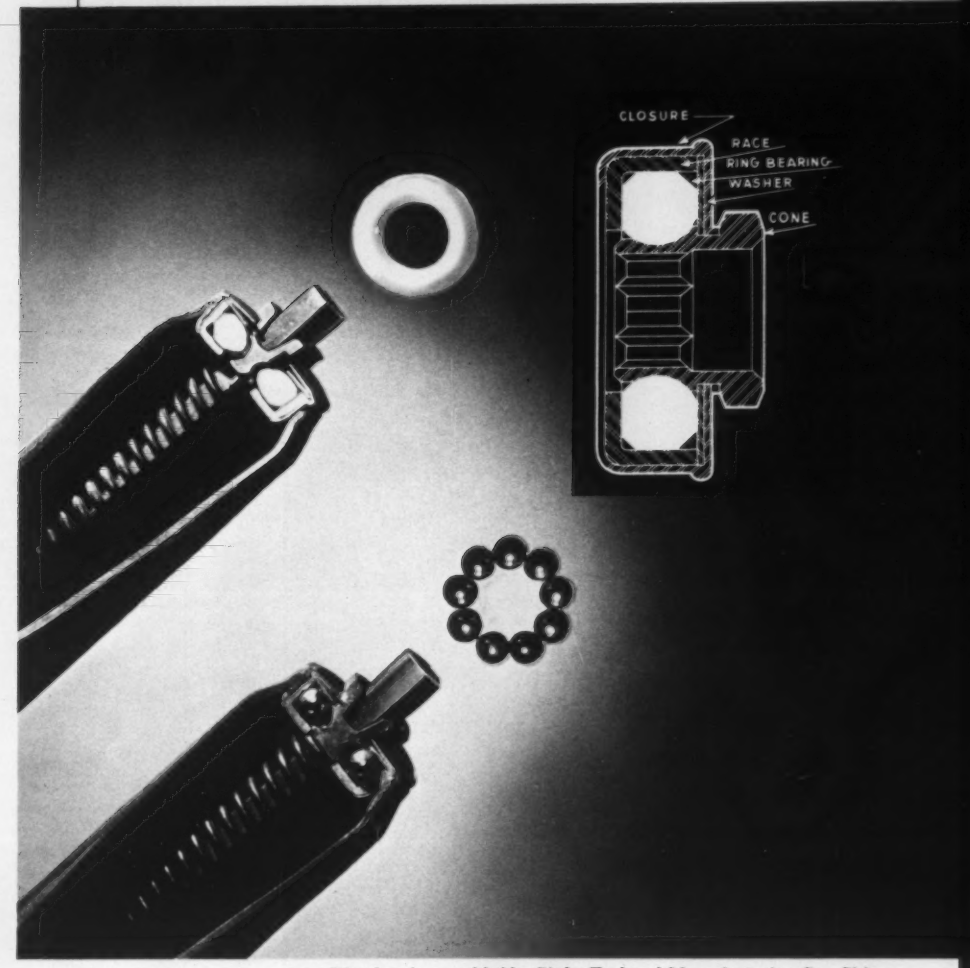
Buffalo Centrifugal Pumps to handle most liquids and slurries under a variety of conditions.

Squier machinery to process sugar cane, coffee and rice. Special processing machinery for chemicals.

working with

Du Pont Delrin®

one of Du Pont's versatile engineering materials



Ring bearings molded by Sinko Tool and Manufacturing Co., Chicago.

Ring bearing illustrates why Delrin® is doing so many jobs once reserved for metals

The use of roller and wheel conveyors in manufacturing, wholesale and retail business has become commonplace today. But as universal as their use is, they have remained relatively noisy mechanisms.

This objection prompted the Rapids-Standard Co., Inc., Grand Rapids, Mich., to seek a new material to replace the steel balls in the bearings of their conveyors. Their choice was rings of "Delrin" acetal resin (roller conveyor shown above). With "Delrin", the conveyors are now "virtually noiseless". The bearings require no lubrication in service, and they will not corrode in normal use. In addition, weight savings of 50-65% have been realized.

This ability of "Delrin" to compete with steel, die-cast zinc and aluminum, cast and machined brass, and cast iron (see reverse side for additional examples) stems from its unique combination of physical properties and design-production economies. With "Delrin", manufacturers are discovering new ways to improve product performance—often at lower cost.

• • •

We will welcome the opportunity to assist you in evaluating how "Delrin" can bring these advantages to your products. A coupon appears on the reverse side for your convenience.

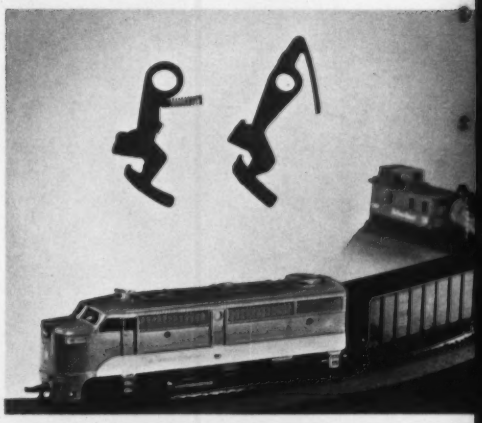
DU PONT
REG U.S. PAT OFF
BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

working with

Du Pont Delrin®

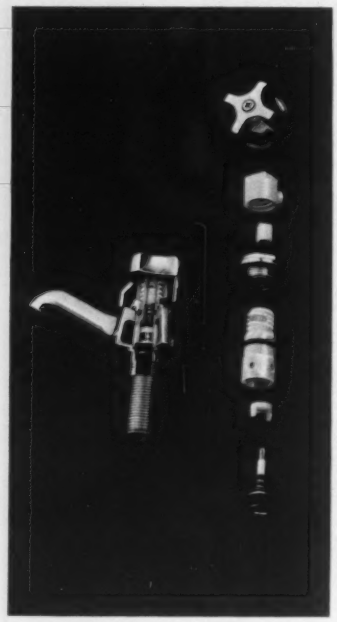
one of Du Pont's versatile engineering materials

These typical end-uses reveal performance and cost advantages of Delrin®



The Lionel Corporation, Irvington, N. J., recently introduced a new HO train line featuring a one-piece coupler molded of "Delrin". Because "Delrin" has the resilience to provide the desired springing action, Lionel designed the integral unit to replace a two-part assembly of coupler and coil spring. The result: a significant assembly saving plus a new sales feature. "Delrin" is also used for the axles, journals and two other truck parts. (Molded by Lionel and Gries Reproducer Corp., New Rochelle, New York.)

The head frame (top) of the new "Lady Ronson" Superbe electric shaver is molded of "Delrin", saving 80% of the weight of the previous gold-plated die-cast zinc part. Ronson Electric Shaver Corp., Stamford, Conn., specified "Delrin" because it could be molded to and hold the necessary dimensions, have a smooth luster without finishing and resist body oils and colognes.



Four parts (in white) of this self-seating faucet are molded of "Delrin", saving 80% of the cost of the machined brass components formerly used by the Kel-Win Manufacturing Co., Inc., Richmond, Va. Kel-Win chose "Delrin" because it resists corrosion and mineral buildup, remains dimensionally stable and eliminates machining operations and rejects. (Molded by Dominion Plastics Co., Colonial Heights, Virginia.)

"Delrin" acetal resin offers designers such properties as strength, stiffness, dimensional stability, resilience and abrasion resistance; and it retains these properties even under exposure to wide variations in temperature, humidity, solvents and stress. Already hundreds of designs taking advantage of these properties, and of the cost savings made possible by rapid injection molding, have been specified or put into commercial production. We suggest that you investigate how "Delrin" can be profitably used in the products you make and the products you use. Commercial processors and our own staff of technologists are ready to assist you.

POLYCHEMICALS DEPARTMENT

DU PONT

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. . . THROUGH CHEMISTRY

E. I. du Pont de Nemours & Co. (Inc.)
Department 134567, Room 2507-D
Nemours Building, Wilmington 98, Delaware

I am interested in evaluating "Delrin" for the following use:

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*Name*_____

*Company*_____ *Position*_____

*Street*_____

*City*_____ *State*_____

DELRIN® *acetal resins*

one of Du Pont's versatile engineering materials

Alathon® · Zytel® · Lucite®

Your Republic Bolt and Nut Distributor Can Help You

Leading manufacturers in every field have found there's only one *best way* to meet emergency fastener needs. They call their Republic Bolt and Nut Distributor.

They call him because he's earned their confidence—because he *always* maintains complete stocks—because when quick delivery is called for, delivery is made *right now!*

You, too, can count on your local Republic Bolt and Nut Distributor for quick, dependable service. Count on him for up-to-the-minute information on new fastener techniques, too, and for practical answers to your fastener problems.

Emergency fastener need, or normal operating requirement, your Republic Bolt and Nut Distributor is a good man to know. Get in touch with him soon.

Call your local distributor for quick deliveries of...

REPUBLIC Bolts and Nuts

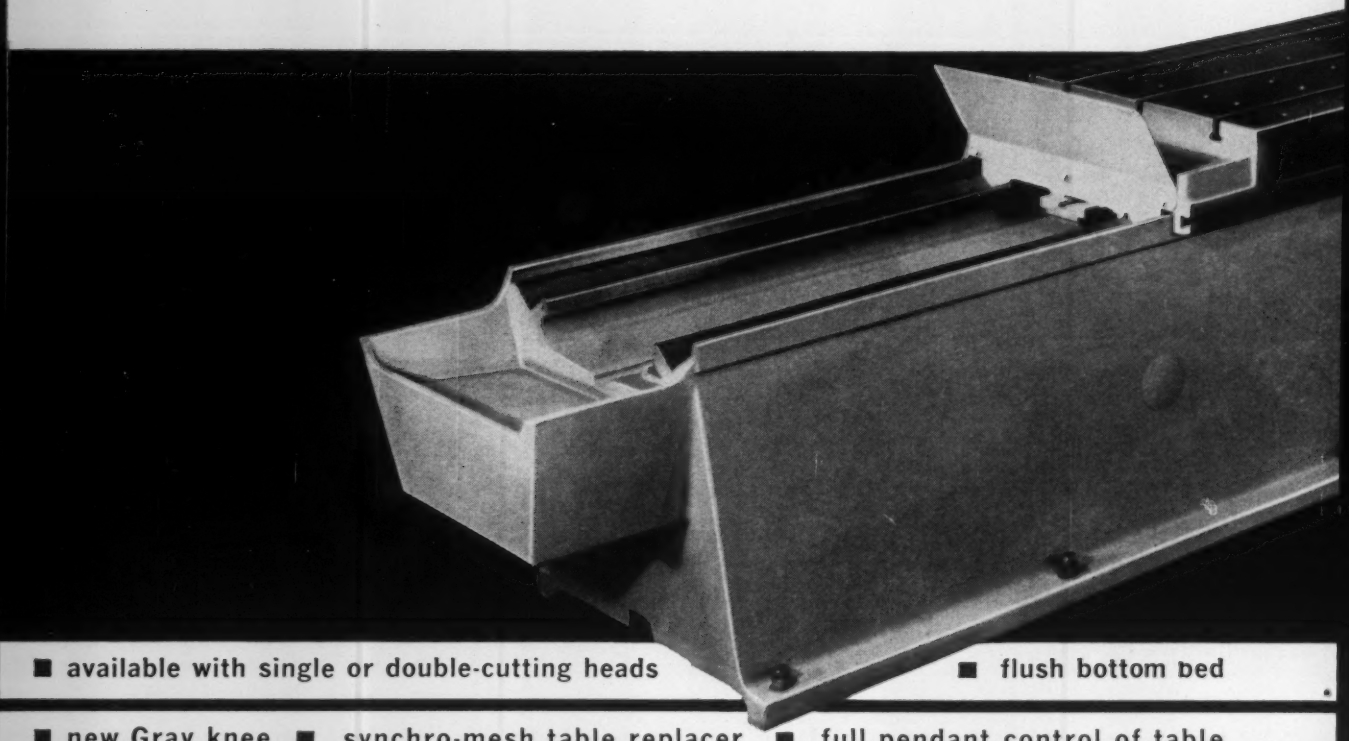
REPUBLIC STEEL

imagine

buying a GRAY planer for only

$30,660

above basic price includes 30" x 6' planer, one rail head, electric drive and controls



- available with single or double-cutting heads
- flush bottom bed
- new Gray knee
- synchro-mesh table replacer
- full pendant control of table
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- full floating drive shaft
- quick acting saddle and slide clamps
- abutment tool aprons
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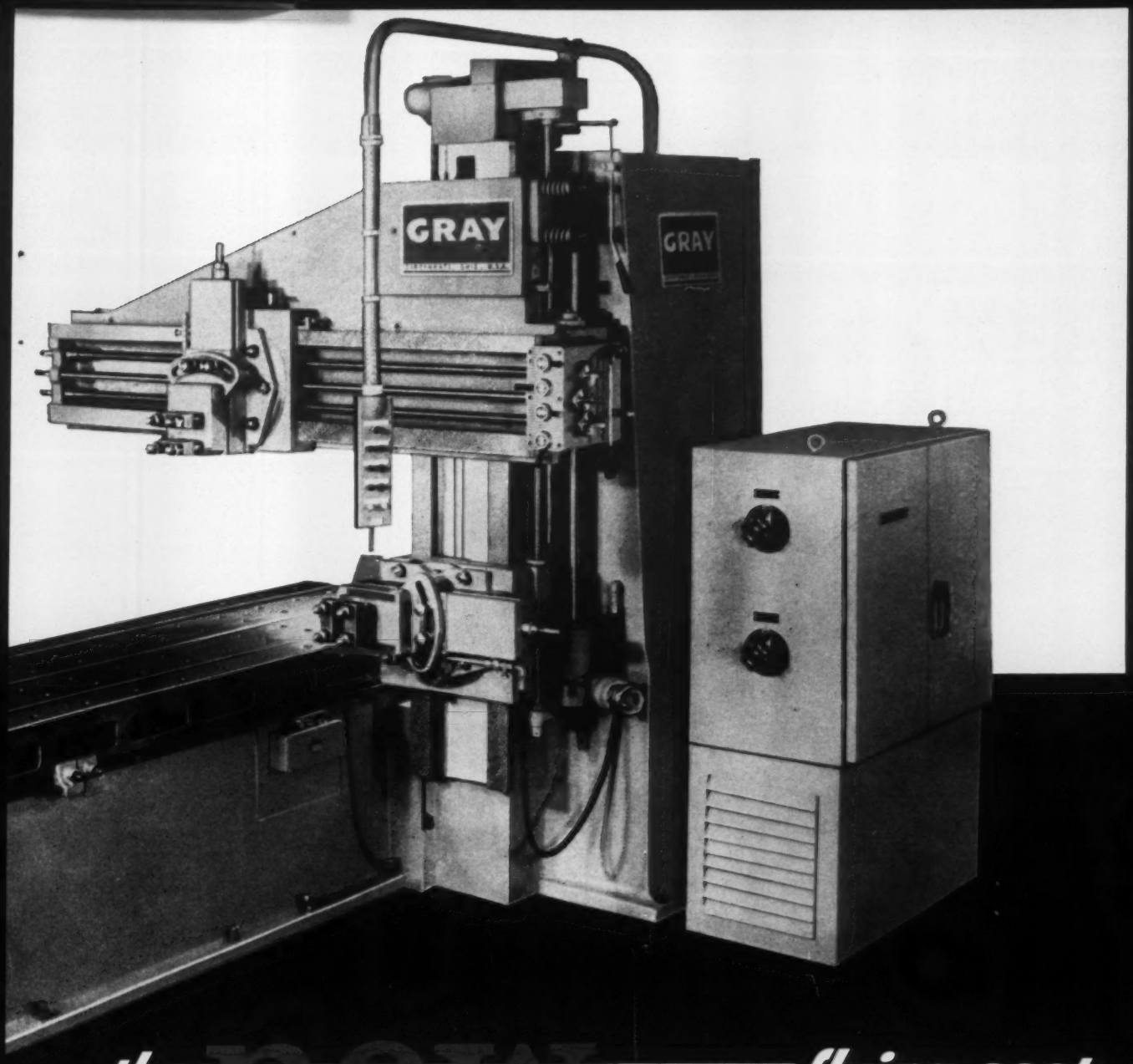

the new 30"-36"-42" flying scot

■ square locked throughout ■ knee and rail counterbalance ■ pyramid side walls on bed

■ vee ways ■ gray non-metallic ways—optional ■ maximum capacity—table width

■ 'reservoil' lubrication ■ high table speeds ■ duplex tables optional ■ new column

■ helicone transmission ■ space saver drive ■ table safety stop ■ forced lubrication

horizontal milling and boring machines
planers
planer type milling machines

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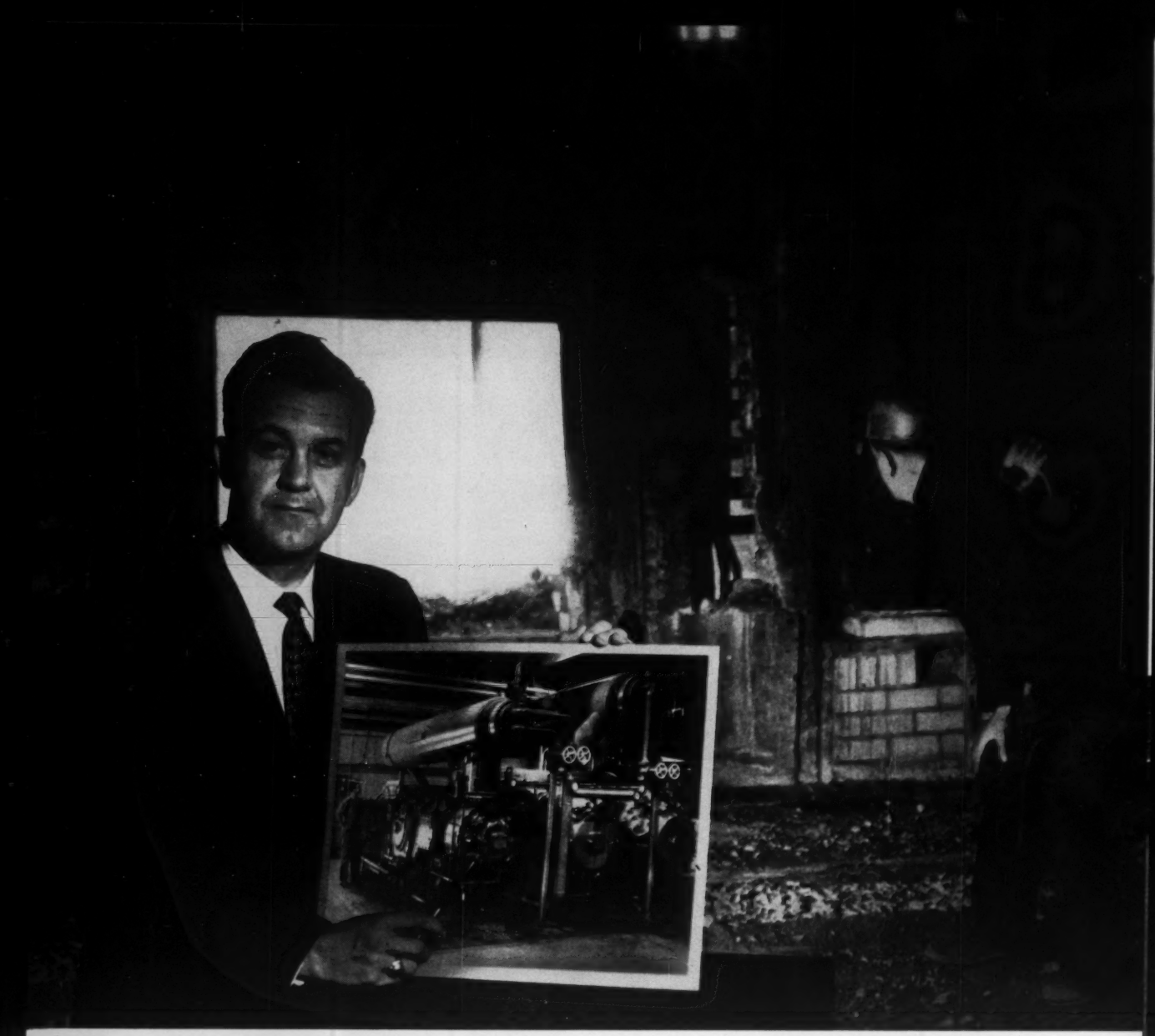
CINCINNATI, OHIO



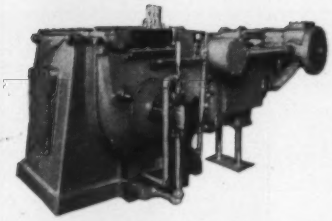
Dann Goodson, *Manager Motor-Driven Compressor Sales, The Cooper-Bessemer Corporation, explains...*

How National Tube steps up production

Lorain Works of National Tube Division, United States Steel Corporation, is increasing ingot output by injection of oxygen into open hearth furnaces. Introduced by lances extending through the roof down into the furnace, the oxygen speeds up production. It is fed directly into the metal in a volume of 28,000 cu. ft. per hour per furnace.

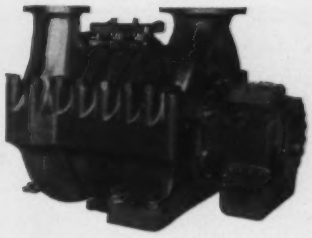
Another major use of oxygen at the Lorain Works is for hot bloom scarfing. The machine shown here removes seams and other defects, conditions blooms for rolling into top quality products. Entire operation is automatic, push-button controlled.

The 2000 hp Cooper-Bessemer Type JM Air Compressor, shown here, plays an important part in the manufacture of the oxygen used for these and other operations at the Lorain Works. This is a 4-stage unit,

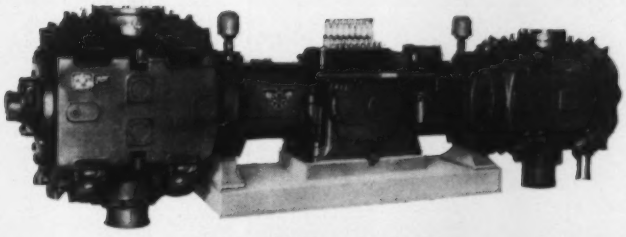


EXPANSION ENGINES

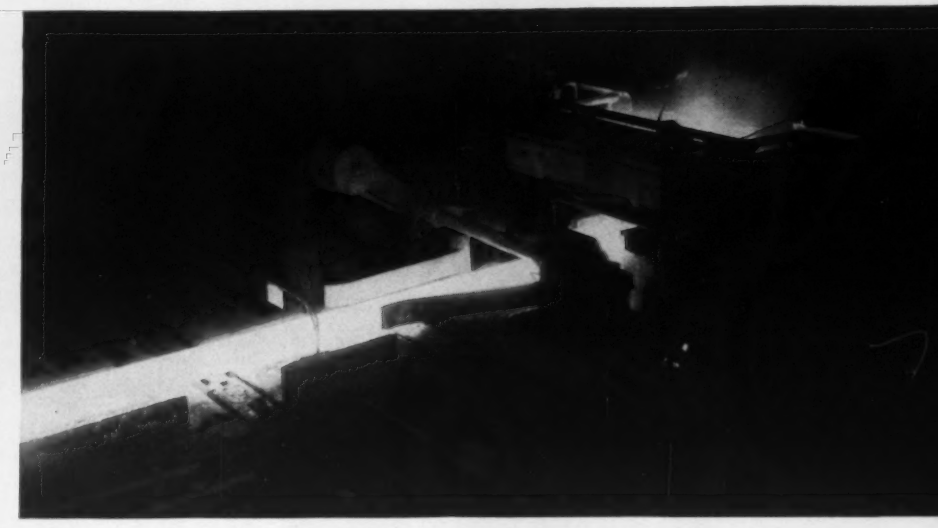
Cooper-Bessemer products for oxygen production include reciprocating and centrifugal compressors, expansion engines and En-Tronic controls.



CENTRIFUGAL COMPRESSORS



RECIPROCATING COMPRESSORS



Hot scarfing machine at Lorain Works steps up deseaming speed, boosts uniformity of this conditioning process.

with oxygen

operating at 300 rpm with a discharge pressure of 1000 lbs. The plant was designed and built by American Messer Corporation.

Cooper-Bessemer can supply all types and sizes of reciprocating or centrifugal compressors, expansion engines and En-Tronic® controls for oxygen production. Call our nearest office for engineering service when you start to plan your facilities.

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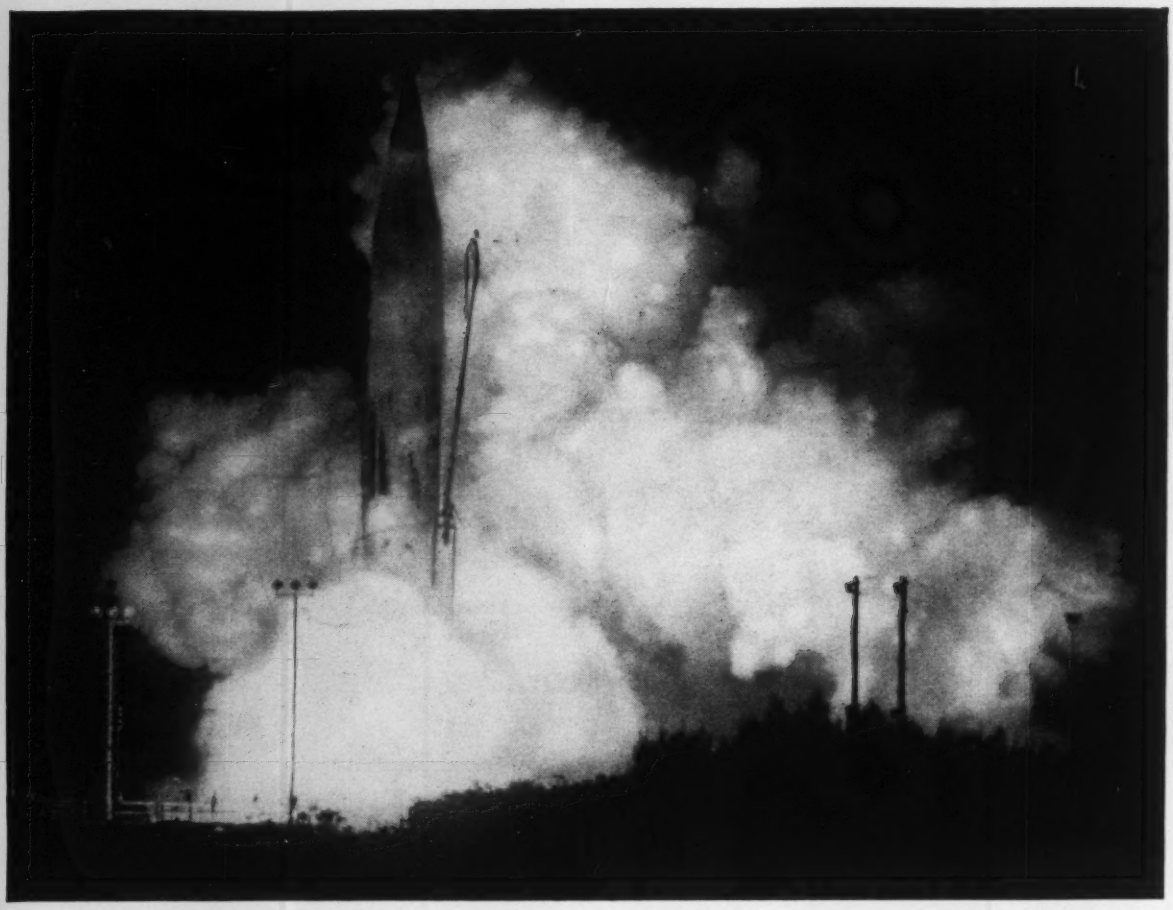
ENGINE OR MOTOR DRIVEN



Record breaking Atlas missile billows flame and vapor as she launches 4¼-ton satellite into orbit. Constructed of Type 301 Nickel Stainless Steel, Atlas is built by Convair (Astronautics) Division of General Dynamics Corporation. *U.S. Air Force photo*

130 tons of missile with a skin thinner than a window pane!

The Nickel Stainless Steel skin of the Atlas missile is actually about one-third as thick as the glass in your window.

And yet look what this skin does:

- It is the sole structural framework for Atlas—130 tons of dead weight at the moment of firing.
- It serves as the wall of the propellant tanks in Atlas' weight-saving design.
- It withstands the deep chill of liquid oxygen (−297°F) . . . the high heat of supersonic speed (400°F–600°F).

. . . And it is less than 1/25 of an inch thick!

No wonder they call stainless the space age metal. No wonder engineers turn more and more to Nickel Stainless Steel as temperatures rise . . . as speeds soar . . . as demands get more and more severe.

But Nickel Stainless Steel has many earthbound applications, too. Its strength and resistance to both corrosion and temperature extremes improves the performance and prolongs the life of many industrial products. And its attractive appearance provides still another reason for its popularity in products for the home.

What's your metal problem? Is it high or low temperatures? Corrosion, stress, fatigue or an unusual combination of factors? Write to us about it. Perhaps Nickel—or one of its alloys—can help you get it off the ground.

The International Nickel Company, Inc.
67 Wall Street New York 5, N.Y.

INCO NICKEL

NICKEL MAKES STEEL PERFORM BETTER LONGER

"We've cut handling costs 50%..."

"...and made a 15% overall savings

says Mr. George W. Smith, Plant Superintendent, Barnard & Leas Manufacturing Company, Inc., Cedar Rapids, Iowa

"We used to order 60% of our materials from the mill, and 40% from a steel service center," says Mr. Smith. "But during the recent steel strike, we looked closely at our inventory situation. After a thorough study, we revised our operation completely. We now order 70% from a steel service center and 30% from the mill.

"We had a scrap problem when we ordered from the mill, because we had to process the materials. The scrap had to be handled and stored until we had enough to market. Today, we order wide flange beams, angles and channels, plate, sheet, and bar size flats and angles direct from U.S. Steel Supply, and they're delivered *pre-cut to the exact shape and size.*

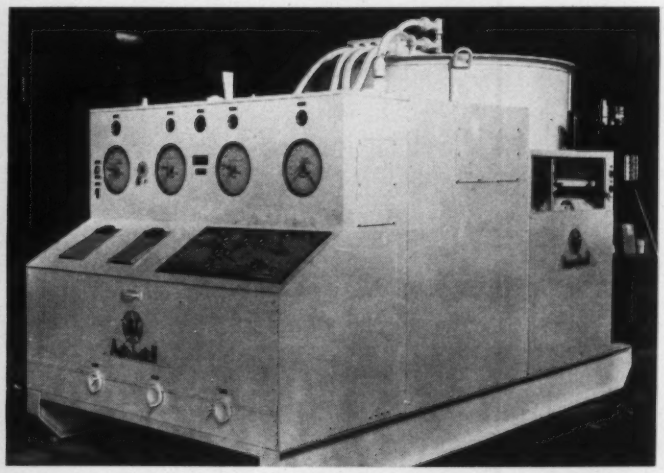
"This saves time and we don't have to invest in expensive machining equipment. And here's another point: the quick and reliable service we get from U.S. Steel Supply has more than once allowed us to accept an urgent order for a piece of heavy equipment.

"For instance, our associate company, Transport Trailers, Inc., was asked to build a 100-ton trailer to transport oil in the North African desert—this job demanded a tough, durable trailer. *We had one month to build it.* Immediately, we called U.S. Steel Supply, gave the order, and explained the urgency of the situation. Two days later, the material arrived pre-cut to the specified sizes. *We met the deadline.* The mill would've taken two or three months to deliver this order, and we'd still have had to cut the material to size.

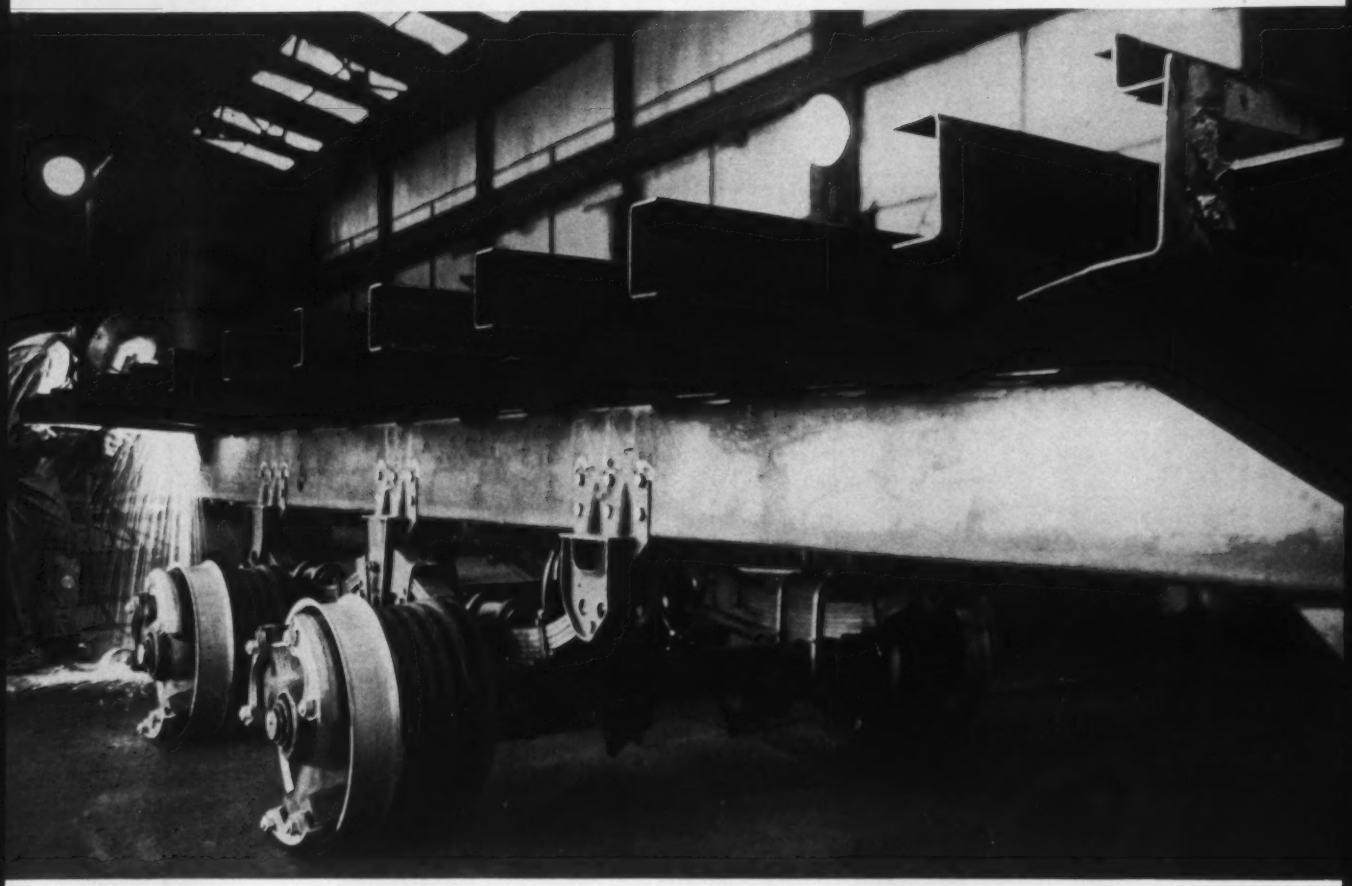
"About 60% of our production is directed to the individual customer's requirements. That's because we produce custom-made trailers. Now, several laws govern trucking throughout the United States. These laws dictate a truck's width, the number and arrangement of its axles, and its load-carrying capacity. Mountain states have special regulations for brakes and wheel types. For these reasons, we never know what specifications will be required in the next order. We have to purchase steel in small lots *as it's needed . . . where it's needed . . pre-cut to size.*"

This account of how one company made substantial steel savings might never have happened, if Barnard & Leas Plant Superintendent, George Smith, hadn't taken the time to attend one of U.S. Steel Supply's Value Analysis Slide Presentations. But he *did.* And he became interested enough to take a long, cold look at his own steel-buying policies. Are you interested in the advantages of U.S. Steel Supply's Value Analysis Program? **Use the coupon on the following page.**

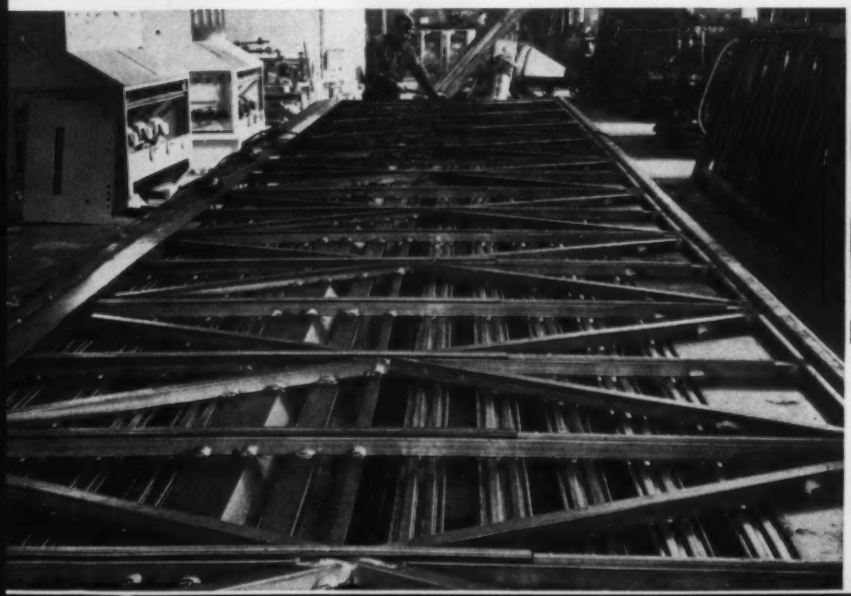
"Our company was founded a century ago to make grain processing equipment. Here are some components for a liquid fertilizer processing plant . . . and here is the finished product."



by dealing with U.S. Steel Supply."



"Our production ranges from processing machinery to trailers. This includes lowbeds, platforms, livestock, grain and special trailers. This man is working on the bed of a livestock trailer. This finished truck body is a completely mobile formula feed blender . . . an excellent example of our production work."



Here's how Value Analysis worked for these U.S. Steel Supply Customers:

"We reduced capital investment, eliminated scrap loss, slashed inventories, and brought our goal for a 60-day inventory turnover within range."

Robert W. Boldt, Purchasing Agent
Borg-Warner Industrial Cranes
Ingersoll Products Division
Borg-Warner Corporation

"We consider U.S. Steel Supply's pre-cutting service a valuable asset. On one contract last year, this service sliced our labor costs 5%, or $12,500, by maintaining production schedules."

Albert O. Wilson, Jr., President
A. O. Wilson Structural Company

"U.S. Steel Supply stocks a variety of material in 20 steel service centers located strategically all over the country. That's our guarantee against costly work delays!"

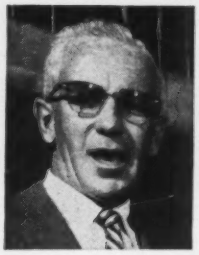
John Ziemba
Cook Technological Center
Missile Components

"We reduced our inventory and made an additional 10,000 square feet of space available for production facilities."

James H. Dray, President
Dray Manufacturing Company

"Thanks to U.S. Steel Supply's prompt, efficient service, we plan to slice our steel inventory in half, and use the additional working capital for a wide-range car-reclaiming and rebuilding program."

Harold A. Berry
Manager of Purchases and Stores
Chicago, Rock Island & Pacific Railroad Company

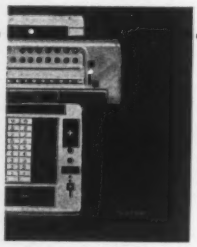


"We eliminated mill 'lead time' and solved our 'dead inventory' problems. U.S. Steel Supply also helped us whittle a space-robbing inventory down to size."

C. R. Campbell, Materials Manager
Rohr Aircraft Corporation

Fill in this coupon and send for your free Value Analysis Folder U.S. Steel Supply has prepared a form that may help you find the cost of maintaining your present inventory. It includes a number of cost items that should apply to your operation, and you may be able to add several others. Ask for this form—and when you receive it, be sure to pass it on to your cost control department and have them fill in your costs item by item. Then call your local U.S. Steel Supply representative for a comparative price run-down on material and special services. We think you'll find that U.S. Steel Supply will be able to show you how to reduce costs and increase profits.

USS is a registered trademark



U.S. Steel Supply Division
Value Analysis
U.S. Steel Corporation
208 South LaSalle Street
Chicago 4, Illinois

Please rush to me a free copy of your Value Analysis Folder.

Name .....

Title .....

Company Name .....

Address .....

City ..... **Zone**..... **State**.....

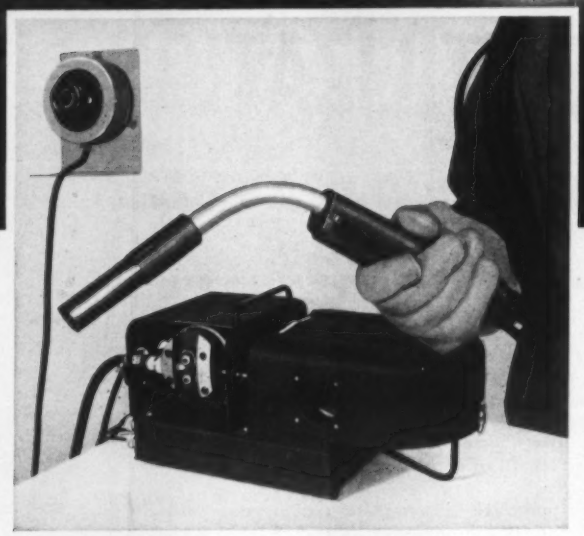
U.S. Steel Supply Division of United States Steel

USS

Steel Service Centers and Complete Steel Strapping Service at: Baltimore, Birmingham, Boston, Chicago, Moline, Cleveland, Houston, Dallas, Los Angeles, Memphis, Milwaukee, Newark, Southington (Conn.), Philadelphia, Seattle, Portland (Ore.), Pittsburgh, St. Louis, St. Paul, San Francisco.

General Offices: 208 South LaSalle Street, Chicago 4, Ill.

new low cost Aircomatic® CO_2 Gun for heavy duty welding of mild steel



LOW COST—New Aircomatic AH60-B Gun and AHF-D Wire Feeder are simple, inexpensive—and expendable parts can be replaced without tools. They're for use especially where rough treatment is the rule. Rating: 600 amps continuous duty DC, with CO_2 buried arc. Wire speeds: 100-600 ipm; wire sizes: .035-3/32". Goose-neck nozzle helps get at hard-to-reach places.

Airco makes the most complete line of manual and automatic gas-shielded arc welding equipment: welders . . . wire . . . gases . . . equipment and accessories. And Airco has the know-how to help you get the most out of these products. For better welding, count on Airco's experience. For details—call Airco.

AIRCO®

AIR REDUCTION SALES COMPANY

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More than 700 Authorized Airco Distributors Coast to Coast

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FOR QUALITY... PRODUCTIVITY ...PROFIT

MACHINING AUTOMATED BY GENERAL ELECTRIC

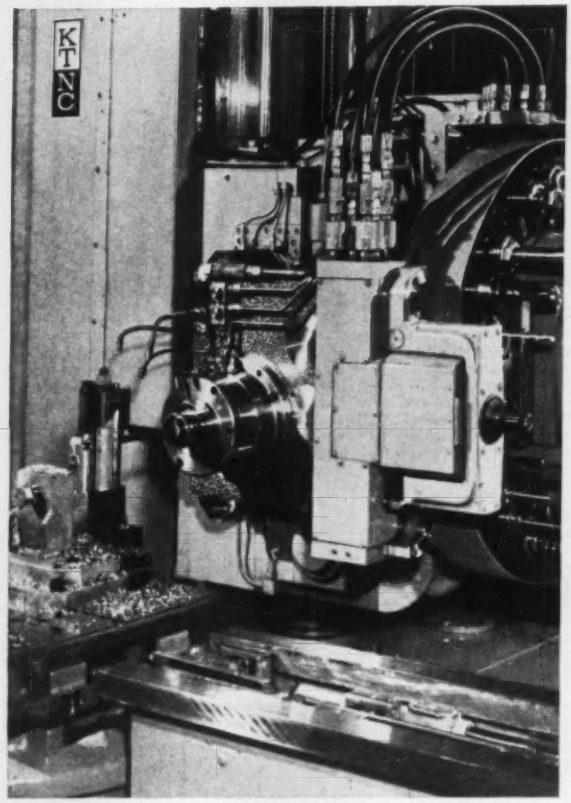
INCREASE MACHINE UTILIZATION

MARK SERIES NUMERICAL CONTROLS... . . . . standard, job-proved packages now in use on a wide variety of machines

General Electric's Mark series of standard, pre-engineered numerical control packages—with systems for controlling 1 to 5 motions plus machine auxiliary functions — are compiling impressive performance records on scores of machines throughout American industry today.

Machine operation is completely automatic—from punched tape prepared on a standard automatic typewriter. If desired, semi-automatic positioning, useful for prototype work, is obtained with manually set dials on the control station.

Key components of a typical Mark package are a controller, a punched tape reader, operator's control station, servo drives and position-sensing units.



ONLY ONE SETUP NEEDED to produce even highly complex parts on this G-E controlled multi-purpose milling, boring and drilling machine means dramatic savings. And, tooling savings on one group of 6 parts totaled $10,000.

83% LEAD-TIME REDUCTION is average for parts produced on this 6-spindle turret drill directed by G-E numerical control. Tooling costs are 40% of former methods. Tape data-storage saves expensive tooling space.

with General Electric numerical control

Move quickly from part to part, cut non-productive machine time

An idle machine . . . and an investment going to waste! This is the case in plants throughout metalworking today—perhaps including yours!

Many reasons are apparent: tool-room lag in making fixtures; long setups during changeover; excessive manual positioning; or, poor machine scheduling due to manual operation. Whatever the case, this adds up to something you cannot afford: high unit costs.

But, there is a solution! General Electric numerical control on today's modern machines provides increased machine utilization that signals the end of long lead times . . . multiple setups . . . long machining cycles . . . and, excessive in-process inventories.

Reports prove the advantages of G-E numerical controls. One user states that with G-E controls, his milling, boring and drilling machine is making chips 55% more of the time . . . setup time is cut 40% . . . and positioning time is 50% less. All this—plus a major reduction in parts inventories made possible by G-E tape control's ability to exactly reproduce a part at any future time—enabled this user to pay for his numerically controlled machine in less than two years.

In another case, a new multi-purpose milling machine—directed by G-E numerical control—selects 31 different tools automatically. Non-productive machine-cycle time is virtually eliminated, and complete part machining is possible on a *single* setup. On one small-lot part, 749 hours were saved. Tooling savings on a group of 6 different parts totaled over $10,000.

Join with these and hundreds of users who are increasing machine utilization and worker productivity, and eliminating special tooling cost with G-E numerical control. See your G-E Apparatus Sales Engineer or machinery builder today. General Electric Co., Specialty Control Dept., Waynesboro, Va. 795-8

Progress Is Our Most Important Product

GENERAL ELECTRIC

UNBRAKO

INDUSTRIAL FASTENERS like this Socket Head Cap Screw are produced to a dynamic reliability standard as a result of SPS research. The SPS line includes a limitless variety of self-locking screws, locknuts and precision fasteners for everything from massive machinery to the most minute products.

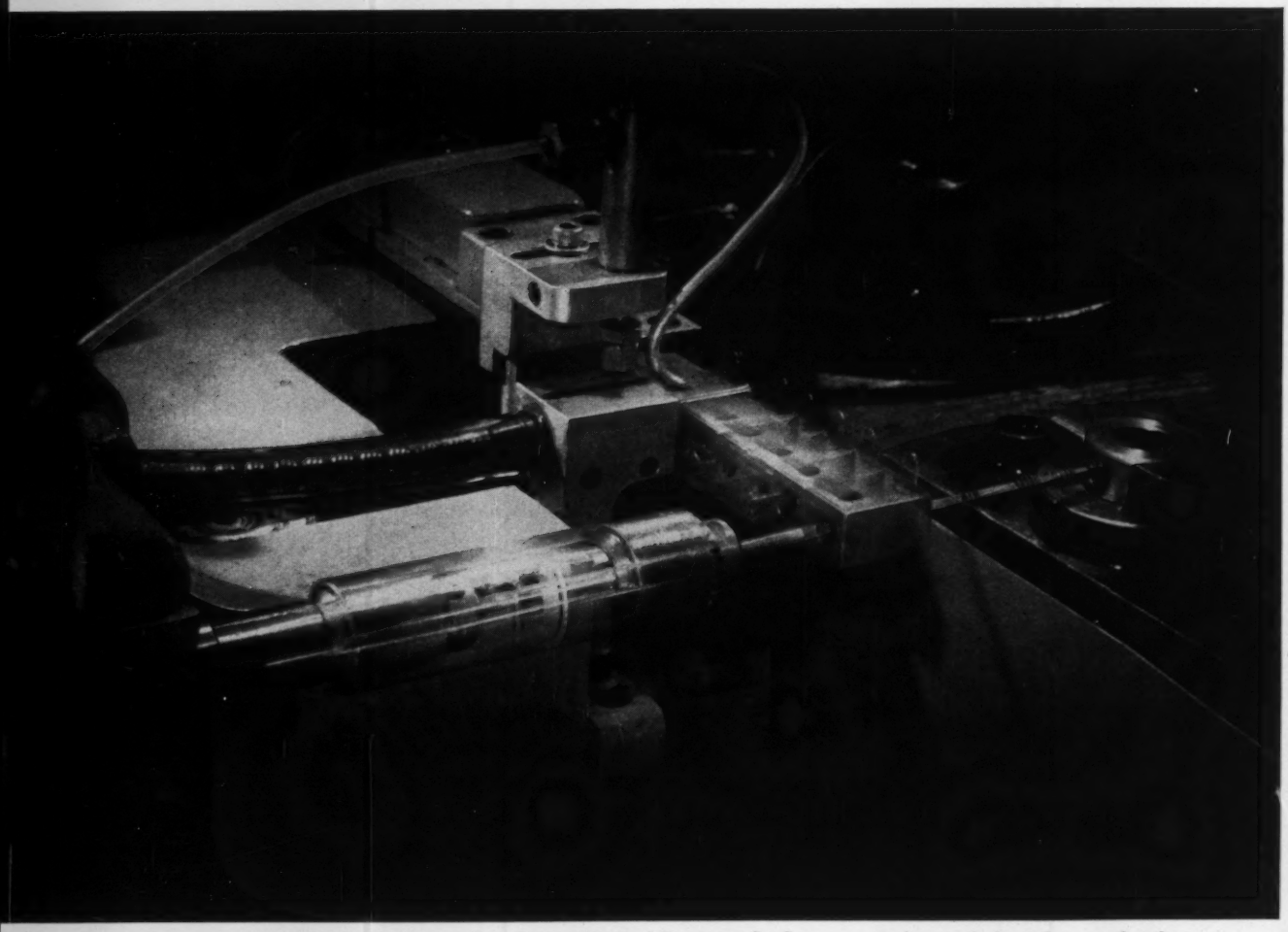
SPS AIRCRAFT

AIRCRAFT/MISSILE FASTENERS like this bolt are produced to ultra-high performance standards at SPS. Today's lightest, strongest fasteners in standard and special designs are products of SPS. Research and development work includes titanium, beryllium and other lightweight, high-strength exotic metals.

SPS NUCLEAR

NUCLEAR COMPONENTS like this cap for a core housing are held to almost unbelievable dimensional tolerances. The nuclear energy field depends on SPS for threaded fasteners, control rod drive mechanisms, motor tubes, core components, instrumentation housings and many other essential parts.

SPS engineering automates



Stop-motion photograph of SPS automated Set Screw Driver. Standard UNBRAKO *Set Screws are made to such close tolerances that they are ideal for use in all high speed automated assembly operations.*

HALLOWELL

SHOP EQUIPMENT for industry and schools is made to the same superior quality standards as other SPS products. The Hallowell line offers broad coverage of standard and special needs in work benches, shelving, and similar equipment. Ruggedness and space efficiency are well identified with Hallowell.

COLUMBIA

OFFICE FURNITURE like this handsome Columbia Nine-to-Five unit sets an office apart with distinctive styling and color combinations. The complete line includes efficiently designed, durable steel office furniture, plus special units, a wide choice of smart chairs, filing cabinets and accessories.

I. E. I.

CAPACITORS FOR ELECTRONICS bearing the IEI trademark are widely used for subminiature circuitry and transistorized applications. This SPS company makes both aluminum and tantalum capacitors, including the lightest and smallest per given capacitance in the industry, to the highest quality standards.

the humble socket set screw

Why would a fastener manufacturer invent an automated machine for customers?

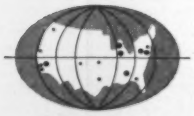
Simple logic—UNBRAKO Set Screws are "automation quality", but until recently lacked an automatic driving mechanism capable of taking full advantage of that quality.

SPS engineers developed the Setomatic® automated set screw driver with remarkable results. Customers now install 2,500 UNBRAKO set screws per hour . . . compared to 335 by hand and 650 by power tools. Costs are down from about $.99 to $.15 per hundred. Quality is higher and more uniform.

Amazing as the machine is, the real story for fastener users is how the Setomatic is daily proving the superior quality, improved design and cleanliness of UNBRAKO High Torque socket set screws.

Automated or hand-driven, your own applications can benefit from the extra reliability built into UNBRAKO set screws. Precision ground stock, rolled threads. Close tolerance socket depth and outside diameter.

Reliability like this comes first at SPS. Write for literature on the Setomatic and how it automated the set screw.

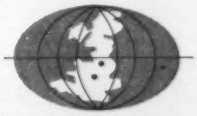


UNITED STATES

CANADA

SPS

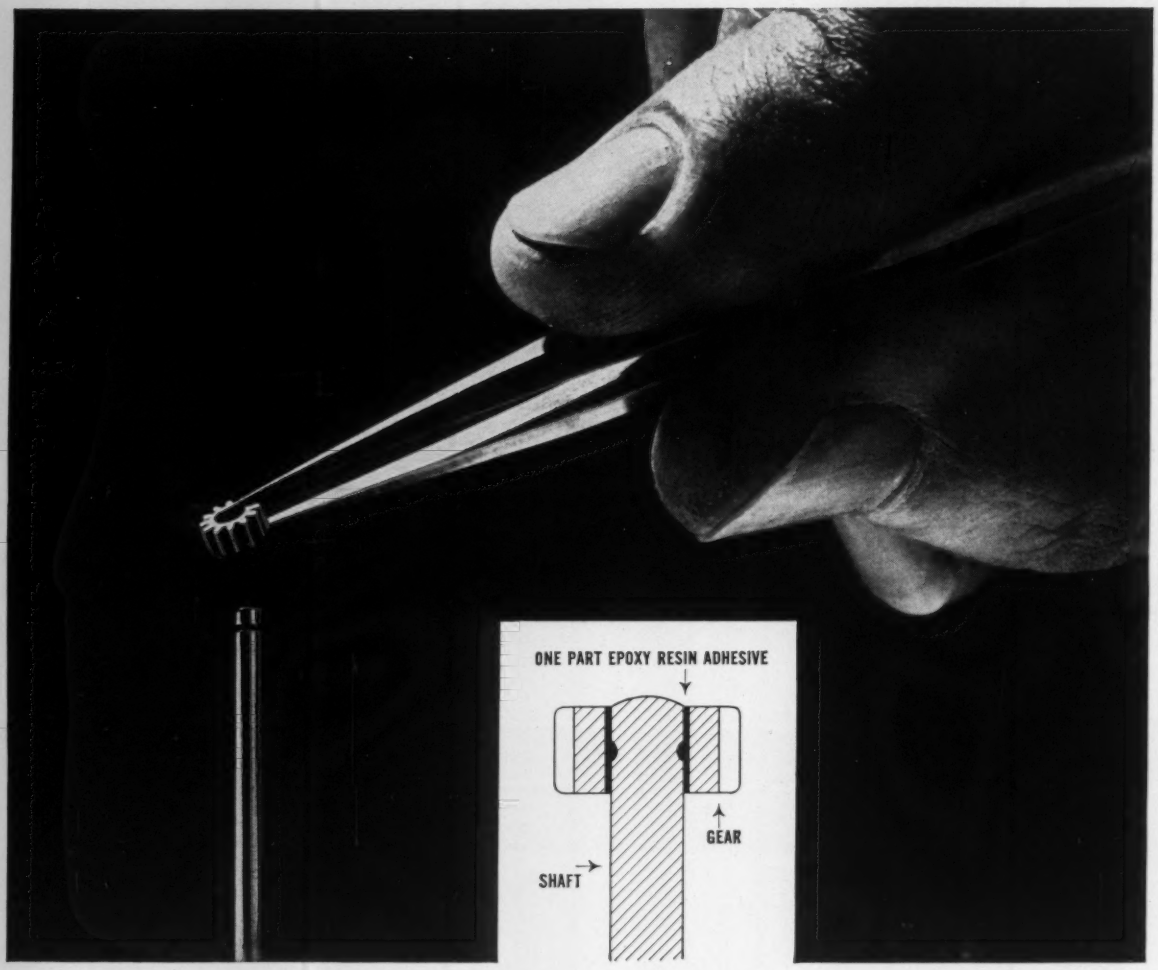
where reliability replaces probability



GREAT BRITAIN

EUROPE

STANDARD PRESSED STEEL CO., Jenkintown, Pa., Santa Ana, Calif. • The Cleveland Cap Screw Company, Cleveland, O. • Columbia Steel Equipment Div., Fort Washington, Pa. • International Electronic Industries, Inc., Nashville, Tenn. • National Machine Products Div., Utica, Mich. • Standco Canada, Ltd., Toronto, Canada • Unbrako Socket Screw Co., Ltd., Coventry and Unbrako Steel Co., Limited, Sheffield, England • Unbrako Schrauben G.m.b.H., Dusseldorf and Koblenz, W. Germany.



How fabricating with SCOTCH-WELD® BRAND Structural Adhesives eliminated 100% inspection step

Timing components now being fabricated with SCOTCH-WELD Adhesive EC-1386 meet precise specifications. The Haydon Division, General Time Corp., Torrington, Conn., is using this one-part epoxy resin base adhesive to bond small pinion gears to rotor shafts in a sub-assembly timing gear operation.

Prior to use of EC-1386, the parts were joined by brazing. But the high heat required affected the material hardness. It also produced shaft distortion, necessitating a 100% inspection step.

Then SCOTCH-WELD Adhesive EC-1386 was used. The high heat previously required was eliminated. With the end of this trouble source, shaft concentricity and material hardness were left unaffected, the 100% inspection eliminated. Close tolerance requirements between shaft and gear were also eliminated because of void-filling properties of the adhesive. A savings of $56.37 per thousand assemblies resulted.

Company after company is discovering how to save money, speed production and eliminate rejects by using SCOTCH-WELD Structural Adhesives in the fabrication of their products. Perhaps these adhesives are at work right now in operations similar to yours. Find out! For free literature without obligation, write today on your company letterhead to: AC&S Division, 3M Company, Dept. SBQ-60, St. Paul 6, Minnesota. "SCOTCH-WELD" is a Reg. T.M. of 3M Co.

ADHESIVES, COATINGS AND SEALERS DIVISION

MINNESOTA MINING AND MANUFACTURING COMPANY

. . . WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

New Roebling Wide Width Tempered Spring Steel makes the most of a good thing

. . . (your money, for instance!)

You count your profits in the number of holes in your scrap. And spring steel that doesn't measure up to the most good parts per inch just isn't the right steel for you.

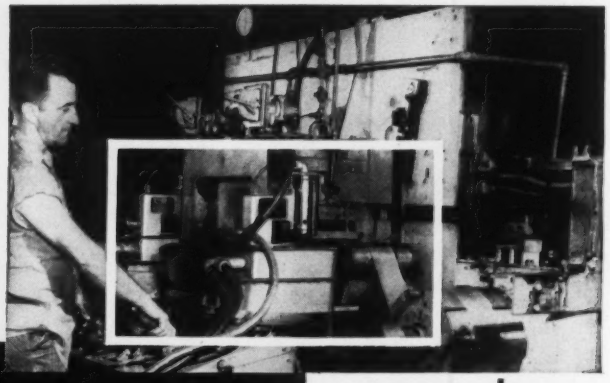
That's why everybody's talking about new Roebling tempered, cold rolled spring steel. Comes in *any* width up to a full handspan wide. 8⅛ inches, that is, by .005 to .062 inches thick. Think how useful that unique extra width can be in getting extra blanks from a length of steel! The thickness is consistent, too.

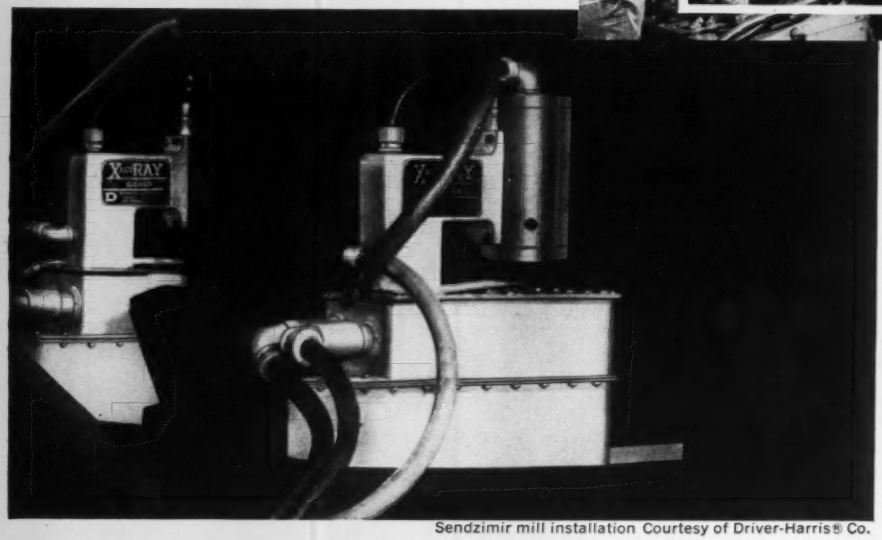
Now pick a finish – any finish – blued, straw, or bright – plain or ground, Roebling's got it. Buy Roebling Cold Rolled Spring Steel and you get uniform excellence in temper and finish. Delivery? No problem at all. Get full facts and figures by writing Roebling's Wire and Cold Rolled Steel Products Division, Trenton 2, New Jersey.

ROEBLING

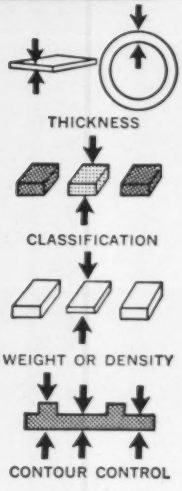
Branch Offices in Principal Cities
John A. Roebling's Sons Division
The Colorado Fuel and Iron Corporation

keep an x-ray "eye" on your metal-rolling costs . . .





Sendzimir mill installation Courtesy of Driver-Harris® Co.



XactRAY NON-CONTACT THICKNESS GAUGES

BOOST YEAR-ROUND PROFITS WITH SPEED AND PRECISION

XactRAY gauges have long been noted for their accuracy in providing absolute thickness measurement of metal on-the-fly. Now they're winning recognition for another great operating characteristic as well—economy—and more and more metal men are discovering why!

Compact and efficient, these gauges require little attention, either for operation or maintenance. And they can be installed practically anywhere in the mill, even close to hot equipment, without upsetting the process line. Mountings are custom built to fit particular requirements.

Continuous XactRAY gauging, coupled with automatic controls and/or alarm devices, saves man-hours and millhours... gives measurements to tolerances as close as ±.000010" whether the metal is moving at 6 or 6,000 feet per minute. Material can be put "on-gauge" in fractions of seconds, and the response to thickness deviations is faster than with most other non-contact gauges. This leads to further savings through reduced scrap.

Whatever your measurement... foil, plate or sheet ...ferrous or non-ferrous metals and alloys... you'll find XactRAY can contribute to your own dollar savings. Further economies can be effected through the addition of XactRAYMATIC controls.

Write for the latest literature giving full information on the cost-cutting advantages of XactRAY gauges. It's yours for the asking through your local Weston representative... or write to Weston Instruments Division, Daystrom, Inc., Newark 12, N. J. *In Canada: Daystrom, Ltd., 840 Caledonia Rd., Toronto 19, Ont. Export: Daystrom's International Sales Division, 100 Empire St., Newark 12, N. J.*

DAYSTROM, INCORPORATED
WESTON INSTRUMENTS DIVISION
World leader in measurement and control

New high-temperature furnace for brazing alloy assemblies solved space and work handling problems for an aircraft engine manufacturer.

HEAT
from General Electric

How General Electric furnace innovation keeps pace with your product progress

Progress in the art of furnace design and manufacture can be vital to the future progress of your business. Recent innovations by General Electric promise tremendous savings to any industry which includes heat treating in its processes.

Example: Jet cooling, developed by General Electric, now permits increased furnace output and up to 30 percent reduction in floor space for annealing furnaces. New design gives faster cooling of light-gage strip.

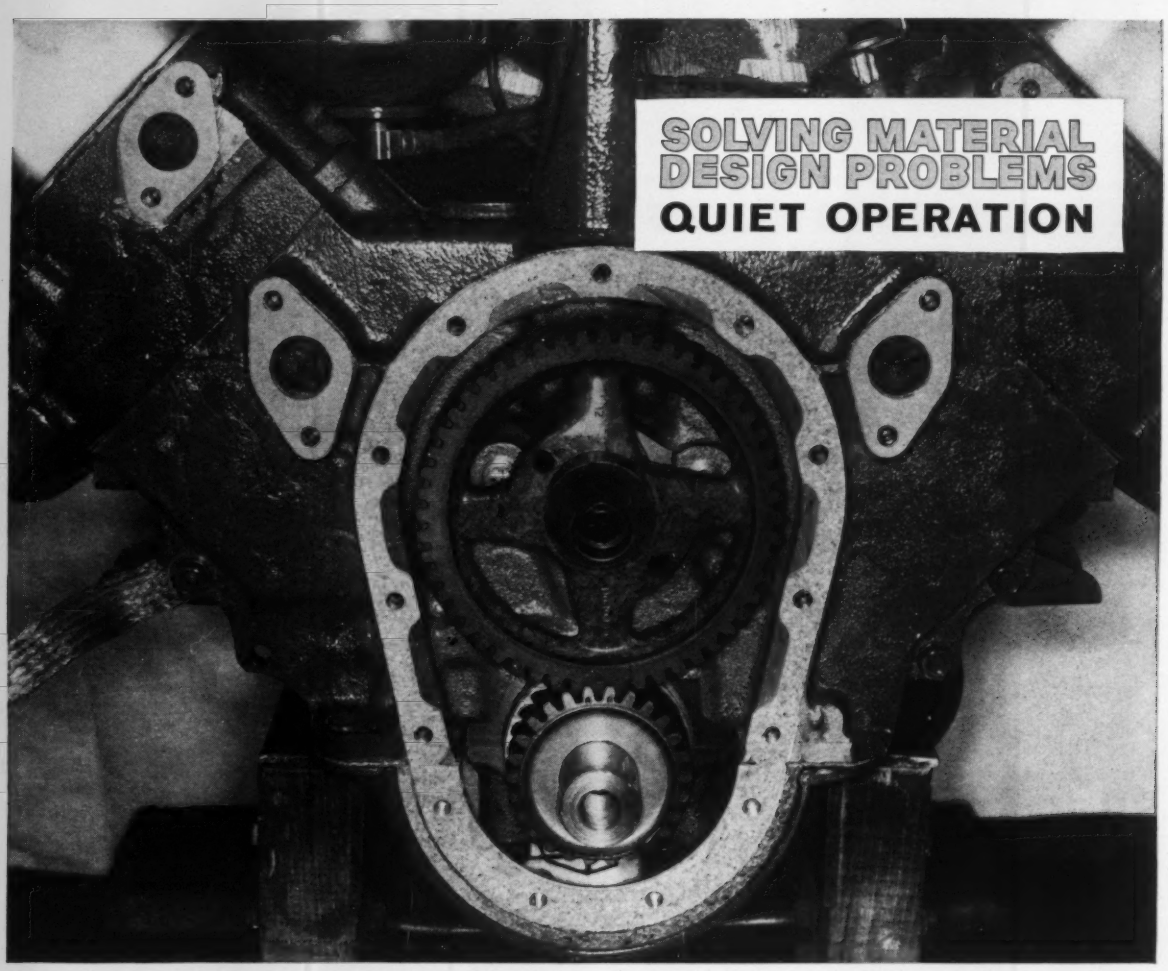
Example: A new muffle-less furnace for bright brazing of stainless steel has saved one customer $45,000 in a single year in muffle replacement costs and downtime.

Example: New General Electric radiation shield furnaces give faster heating and cooling cycles than hot retort furnaces. The new furnaces are used with vacuum, or inert or hydrogen atmospheres up to 4200 F.

Next time you're modernizing or adding to your heat treating line be sure to call your G-E Apparatus Sales Office. Take advantage of the "added value" engineering service that General Electric provides.

721-32

GENERAL ELECTRIC



Timing gears made of CDF Celoron will not pick up and amplify sound due to Celoron's naturally low tone frequency. Tests show that Celoron gears reduce noise by up to 50% compared to all-metal gear sets!

Made of quality controlled, fabric reinforced phenolic resin, Celoron® high-impact gears are constantly replacing metal in critical areas ranging from earth-moving machinery to compact cars to movie projectors.

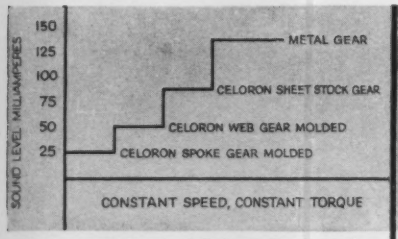
Celoron molded materials are only one family of products from industry's largest selection of non-metallic structural and electrical materials . . . including thermosetting laminates, vulcanized fibre, silicone rubber, and mica.

This wide choice gives you every assurance of meeting your exact quality and cost needs in plastic material. Refer to Sweets PD file or write to us for the latest Celoron catalog.

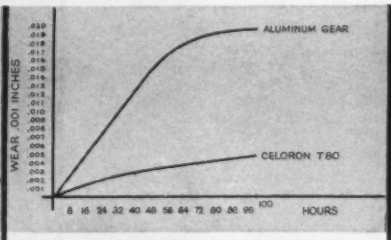
CONTINENTAL-DIAMOND FIBRE

A SUBSIDIARY OF THE Bakelite COMPANY • NEWARK 85, DEL.

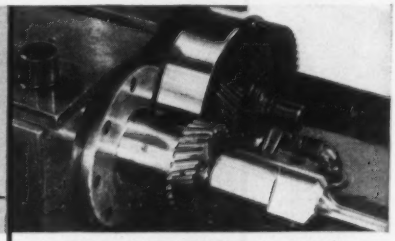
In Canada, 46 Hollinger Road, Toronto 16, Ont.



Low sound level of Celoron is shown by this graph which compares metal to the different types of Celoron gears.



Long wearing characteristics of Celoron gears are here contrasted to the shorter life spans of metal-made gears.

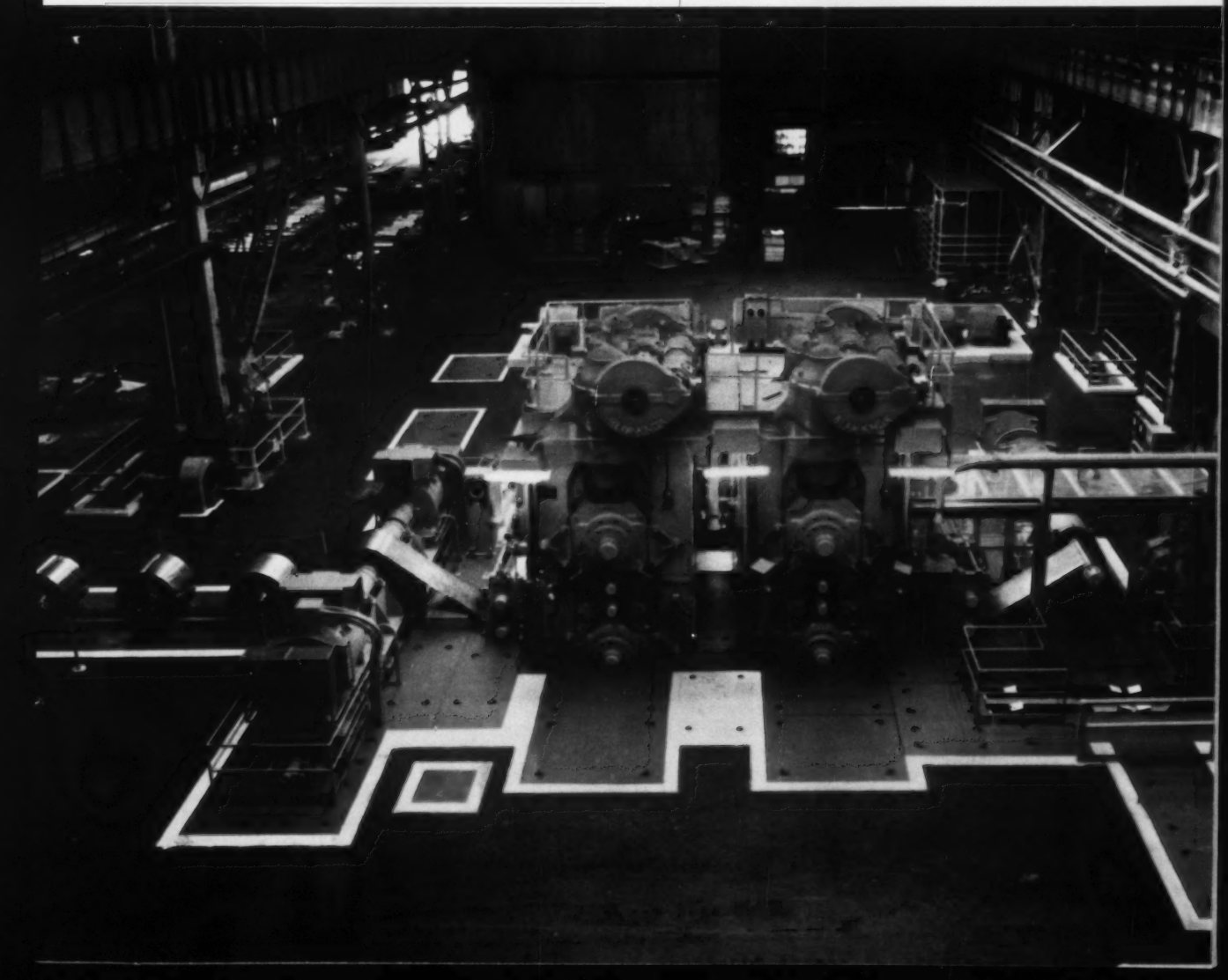


Quality control of Celoron gears is assured by special testing machines such as this in CDF laboratories.

BLAW-KNOX

Blaw-Knox designs and builds a full range of two high and four high Temper Mills for integration into sheet, strip, and tin plate processing operations. Blaw-Knox equipment for the metals industry includes complete rolling mill installations and auxiliary equipment for ferrous and non-ferrous metals, sheet and strip processing equipment, electrolytic tinning, annealing, and galvanizing lines, seamless pipe and tube mills, draw benches, and cold draw equipment, Blaw-Knox Medart cold finishing equipment, iron, alloy iron and steel rolls, carbon and alloy steel castings, fabricated steel plate or cast-weld design weldments, steel plant equipment, and heat and corrosion resisting alloy castings. Blaw-Knox Company, Foundry and Mill Machinery Division, Blaw-Knox Bldg., 300 Sixth Ave., Pittsburgh 22, Pa.

19- and 53-inch x 48-inch high speed 2-stand Temper Mill.



Put materials handling on a PRODUCTION LINE BASIS with a UNIT-COLES mobile crane

This 12-ton Model S-1210 mobile crane is moving tractor parts from trailer to storage area at the International Harvester Plant, Chicago.

WORLD'S SAFEST CRANE

One of many UNIT-COLES safety devices is this safe load indicator which automatically warns operator of dangerous load condition, then instantaneously "stops and holds" boom and load-hoist motions.

Mounted on a self-propelled carrier, a UNIT-COLES mobile crane travels quickly, indoors or outdoors, from one end of the plant to the other . . . handles materials flow from start to finish with production line efficiency. A cantilever-type boom gives *this crane* lower-than-usual overall height, making it ideal for in-plant operation and for unloading or loading motor or rail carriers. Tail swing and turning radius are shortest of any full-circle revolving crane, providing easy maneuverability in congested areas. Instinctive "left-for-left" and "right-for-right" steering, regardless of direction cab is facing in relation to chassis, *plus* independent swing and travel, simplifies travel along narrow aisles.

Load-hoist, swing, and boom-hoist are independently powered by separate electric motors with an infinite range of speeds. At the touch of a lever the operator raises or lowers a load quickly, or inches it so slowly that it barely appears to move. And, with boom-hoist independent, he can boom up or down during swing without pausing.

Operating a UNIT-COLES is really simple — no gears to shift, no clutches to move. Inexperienced men have become competent operators within a few hours. The man in the cab feels safe and secure, too, knowing that his UNIT-COLES is fitted with exclusive safety devices like the automatic safe load indicator, self-resetting limit switches on load-hoist and boom-hoist, and fail-safe automatic braking, with "dead man control", on all crane motions.

UNIT-COLES mobile cranes are available in capacities from 5 to 50 tons and with a wide range of versatile lifting attachments. For details and the name of your nearest dealer, write today.

UNIT

UNIT CRANE & SHOVEL CORP.

6705 W. Burnham Street
Milwaukee 19, Wisconsin

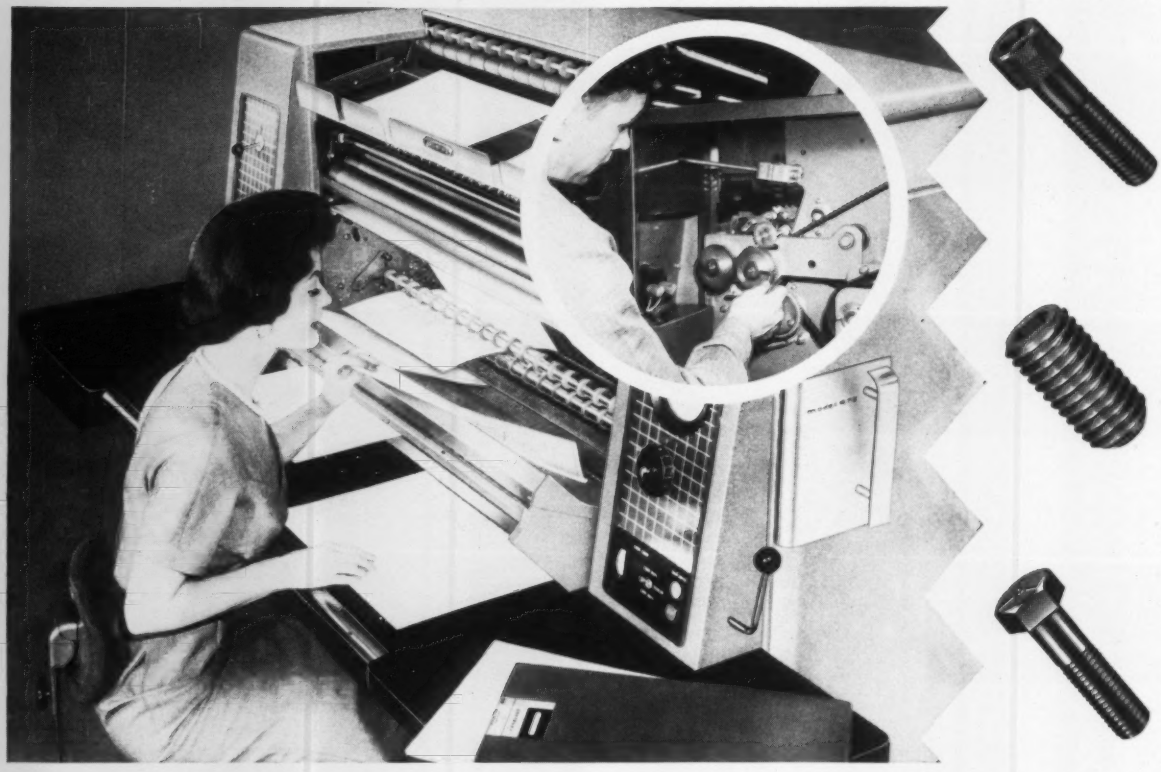
J & L Steel Service Centers—efficient and dependable. Anywhere you look—from the order department, through every processing operation, to the well-organized shipping floor like this one—you'll find something new, something better at The Department Store of Steel. Unparalleled expansion, new buildings, the latest machinery and equipment, increased stocks of steel, stainless and aluminum, and skilled warehousemen trained to give *extra* care to every order—all add up to faster, more efficient service for J & L customers.

Take advantage of the streamlined, time-saver service J & L offers. Count on The Department Store of Steel. You'll get exactly what you want—when you want it.

J & L Steel Warehouse Division

CHICAGO • CINCINNATI • CLEVELAND • DETROIT
HAMMOND • INDIANAPOLIS • LANCASTER • LOUISVILLE • MEMPHIS
NASHVILLE • NEW ORLEANS • NEW YORK • PITTSBURGH

IT PAYS TO STANDARDIZE ON **STANSCREW**



Stanscrew suggests... BRUNING verifies... Socket set screws solve *Copyflex* problem

Charles Bruning, Inc., manufacturers of the widely accepted Copyflex, recently found that the fasteners they were using to attach the unit's sprockets and gears did not meet the rigid performance standards they set up for all component parts.

Bruning's distributor arranged a visit from a Stanscrew specialist, who recommended Stanscrew's regular socket set screws. Bruning verified their operational efficiency with exhaustive laboratory and engineering tests . . . made the conversion . . . and eliminated the loosening problem (plus eliminating many service calls).

Now, 100 Stanscrew fasteners are specified for each Model 675 Copyflex. In addition to socket set screws, they include socket head, hex head, and fillister head cap screws which are used in a wide variety of critical applications.

Like Bruning, more and more industrial leaders are learning it pays to standardize on Stanscrew. Their more than 5,500 different standard fasteners provide economical answers to the overwhelming majority of all industrial requirements . . . and are produced to consistent quality standards which eliminate production problems and lower assembly costs.

The Stanscrew fastener specialist may be able to help you cut fastener costs. Your Stanscrew distributor will be happy to arrange a prompt visit. Call him today.

STANSCREW FASTENERS

CHICAGO | THE CHICAGO SCREW COMPANY, BELLWOOD, ILLINOIS
HMS | HARTFORD MACHINE SCREW COMPANY, HARTFORD, CONNECTICUT
WESTERN | THE WESTERN AUTOMATIC MACHINE SCREW COMPANY, ELYRIA, OHIO

STANDARD SCREW COMPANY 2701 Washington Boulevard, Bellwood, Illinois

GENERAL ELECTRIC

Developed Exclusively for Tri-Clad* '55' Motors

NEW THERMO-TECTOR SYSTEM POSITIVELY

ELIMINATES OVERLOAD BURNOUT

Allows Maximum Motor Output -- Safely!

Now—Tri-Clad '55' motors have simple, direct-acting thermal protectors that *positively* end winding failures from overloads!

New Thermo-Tector heat-sensing switches buried in stator windings react *instantly* to prevent heat damage. Unique Thermo-Tector "anticipation" feature varies motor shutoff point according to rate of winding heat rise. This ends need for operating safety margin.

Thermo-Tector system uses no costly amplifying relays or special circuitry, works with any General Electric motor controller.

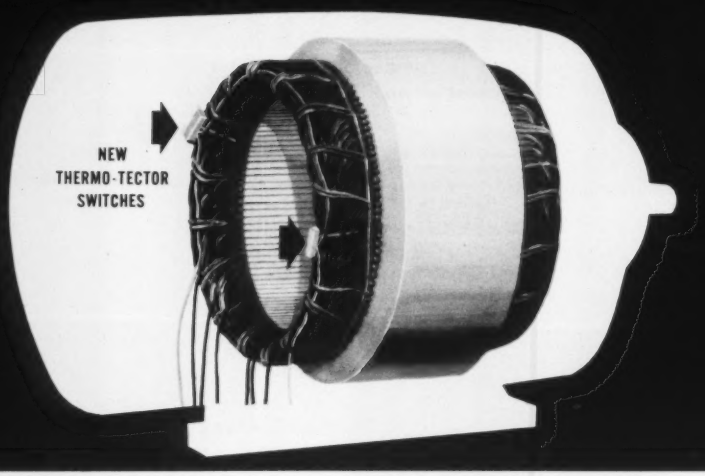
*Registered Trade mark of General Electric Co.

TURN PAGE FOR FURTHER INFORMATION

NOW!

GET MAXIMUM MOTOR OUTPUT WITH NO DANGER OF OVERLOAD BURNOUT!

New THERMO-TECTOR System
Operates IN THE STATOR . . .
Protects Under All Conditions!



You get *full output* from Tri-Clad '55' motors with Thermo-Tector protection. No operating "safety margin" is necessary since Thermo-Tector switches react instantly to prevent damage from *any* type of winding overload. New General Electric Thermo-Tector switches—buried deeply in the coils of the Tri-Clad '55' motor—are so durable they handle size 4 contactor coil current with *no costly amplifying relays.* Any conventional G-E motor controller works with the Thermo-Tector system.

Thermo-Tector protection is available on *all* Tri-Clad '55' motors in frames 254U-445U. For more information, contact your G-E Apparatus Sales Office or write for Bulletin GEA-7092, Section 866-2, Schenectady 5, N. Y.

SMALL AC MOTOR & GENERATOR DEPARTMENT

GENERAL ELECTRIC

INCREASED FOREIGN BUSINESS kept machine tool orders from falling off significantly in May. Net new orders for metal cutting tools totaled $38 million. But $11.6 million of the total was in foreign orders. April orders totaled $36.7 million for cutting tools, with $7.8 million in foreign orders.

IN FORMING TYPE MACHINE TOOLS, the May total of $11.8 million was well below the April net new order total of $15.15 million. But here, too, foreign orders gained, from $3.75 million in April to $5.65 million in May. Domestic orders dropped from $11.4 million in April to $6.15 in May.

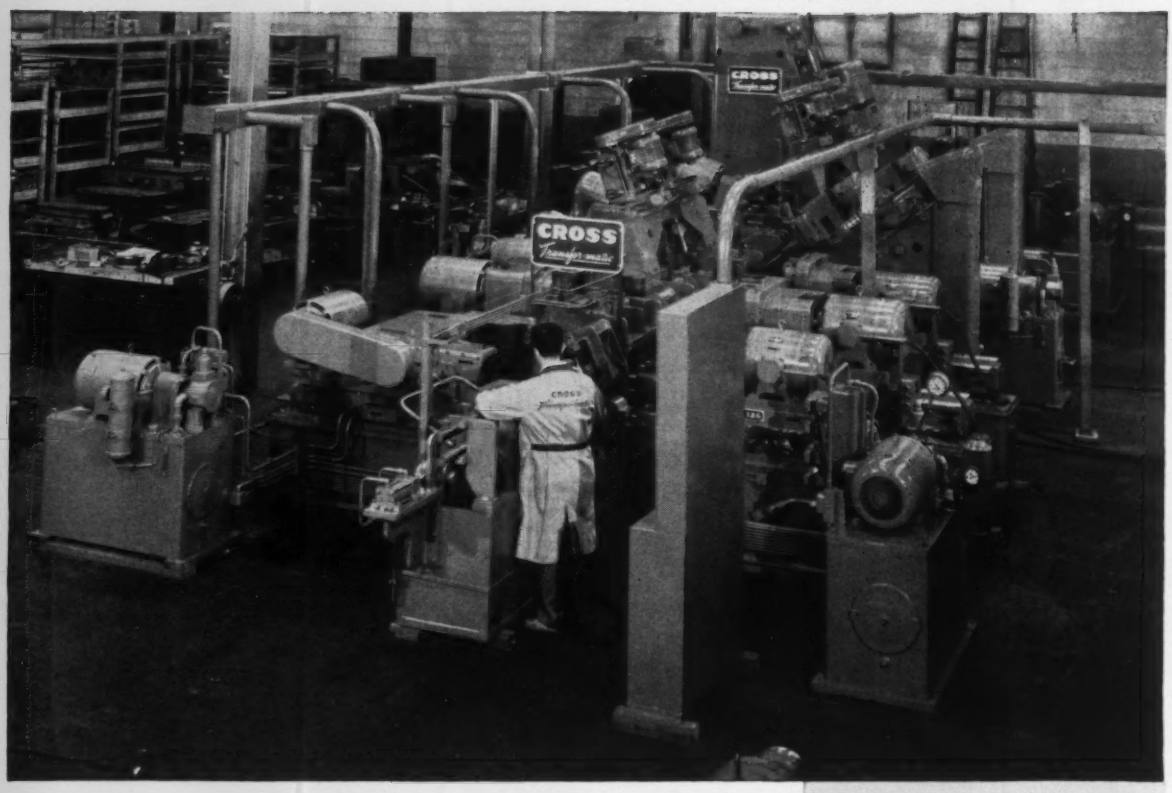
PRICE REDUCTIONS CAN STILL INCREASE SALES, says U. of Michigan professor, Paul McCracken. The educator, a former member of the President's three-man Council of Economic Advisors, challenged some price theories: "The comfortable view among businessmen that price reductions do no good and price increases do little harm needs reexamination. It derives little support from surveys of consumer reaction to price changes."

UNFILLED ORDERS FOR MACHINERY are now smaller relative to shipments than at any time in the past decade, according to the Value Line Investment Survey. The survey blames this on the disappointing trend of corporate profits. New orders for 1960 will probably be only 7½ pct above those of 1959, it concludes.

MAY BOOKINGS OF FABRICATED STRUCTURAL STEEL totaled 269,941 tons, says The American Institute of Steel Construction. While a sharp decrease from the month before, it was still 12 pct better than the same month a year ago. Total bookings for the first five months of 1960 were 1,467,791 tons, approximately 146,000 tons more than the corresponding period of last year.

APPLIANCE SALES LAG IS BLAMED ON NON-SALESMANSHIP by R. H. Quayle, Jr., president of the Norge Div. of Borg-Warner Corp. Says Mr. Quayle: "An appliance is now treated (by retailers) as a commodity instead of an item requiring speciality selling." The Norge executive calls for more "feature demonstrations and constructive face-to-face selling."

GAS WATER HEATING SHIPMENTS DROPPED to 201,700 units in May compared to 239,300 in May 1959. Sales for the first five months of this year totaled 1,096,300 compared to 1,292,400 units sold in the same period in 1959.



Why Cross chose Timken® bearings for all 148 drill spindles

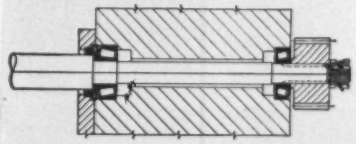
THIS huge Cross transfer machine drills and taps holes in automobile engine blocks at new highs in speed and accuracy. To assure maximum user economy and machine life, Cross engineers chose Timken® tapered roller bearings for the machine's 148 drill spindles. Here's why:

1) *They maintain precision longer.* Timken bearings are geometrically designed to give true rolling motion, precision manufactured to live up to their design.

2) *They're extra tough* because Timken bearings are made of the finest bearing-quality alloy steel available.

When you use a machine with Timken bearings, you get all the *extra* benefits of Timken Company leadership in tapered roller bearing design and in engineering service. We maintain the industry's most modern laboratory to test bearing applications. To get better machines, make sure they're Timken bearing-equipped. ***When you buy Timken bearings you get...*** 1) *Quality you can take for granted.* 2) *Service you can't get anywhere else.* 3) *The best-known name in bearings.* 4) *The pace setter in lower bearing costs.* The Timken Roller Bearing Company, Canton 6, O. Cable: "TIMROSCO". *Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits.* Canadian Division: Canadian Timken, St. Thomas, Ontario.

How **THE CROSS CO.** mounts 148 drill spindles of its Transfermatic machine on Timken bearings to give longer bearing life, maintain accuracy.



Industry rolls on

TIMKEN®

tapered roller bearings

Don't Shy Away From Automation For Job Shop Operations

Westinghouse automated a low volume, multi-model product line profitably.

It developed a new concept, discarding old notions about how and where automation could be used. — By G. J. McManus.

■ A new approach to automation may sweep away basic notions of how volume and variety limit production methods.

This approach takes full automation as a starting point, then works back. Instead of modifying existing operations in the direction of automation, the new concept builds on a foundation of extreme automation.

If this sounds like a doctrine for mass production only, it is not. Westinghouse Electric Corp. provides a working example of how the circular approach pays off in low volume situations.

Automate . . . Back Off—Four years ago, Westinghouse set out to build a power circuit breaker plant at Trafford, Pa. Taking an operation that had always been run on job shop lines, it discarded job shop thinking at the outset.

"We started with the idea of automating as fully as possible," says P. D. O'Donnell, assistant manager of the power circuit breaker department. "Then we backed off until we could justify equipment on the basis of savings."

"We approached this thing as though we were going to build automobiles," is another Westinghouse comment.

Takes Giant Step—By taking a giant step forward and then backing off in small steps, planners came up with a plant that is truly automated. Circuit breaker tanks are shot blasted, welded and fabricated on a 200 ft progressive line. Gravity conveyors and automatic positioning devices do most of the handling in this sequence.

Programmed machines at Trafford include two tape controlled turret lathes; a tape controlled milling and drilling machine; two automatic checking lathes. Automatic burnout machines and automatic welding devices speed production. The whole plant has been laid out for straight-line flow.

Wide Product Range—From a product standpoint, Trafford is far removed from anything like mass production. The power circuit breaker department builds less than 2000 units a year. This total is made up of some 30 different models. They range in diameter from 24 in. to 66 in.; in price from $200 a unit to $190,000 a unit. A com-

IN AND OUT: Bottoms are joined to tank shells with both an internal and external welded seam, at two separate but similar work stations.

plete new family of gas circuit breakers is now adding to product diversity.

Despite relatively low volume and wide variety, automation seems to be working out very nicely at Trafford. According to J. W. Stirling, manager of the department, the new facility has reduced the manufacturing cycle for floor mounted models by 80 pct. Process inventory has been cut 15 to 20 pct. On the basis of equal floor space, the new facility has 50 pct more capacity than the old one.

Organize the Program—Surprisingly enough, the extensive modernization has been accomplished without raising the break-even point. The new facility has a much higher profit potential than the old one but it does not require any higher volume to make money.

As a means of balancing innovation with practical limitations, the Westinghouse project suggests these organizing elements:

1. Indoctrination of responsible people with the need for sweeping change.
2. Attention to financial standards and practical experience in evaluating proposals.
3. Providing the tools and administrative procedures for sound decisions.
4. Detailed, systematic analysis of production requirements.

A Clean Break—In the Trafford case, part of the spark for new thinking came from circumstances. Westinghouse had been building power circuit breakers at its big apparatus plant in East Pittsburgh. With limited space available and market growth expected, the company in 1956 decided to build a separate new plant for circuit breakers at nearby Trafford.

The prospect of a move into a brand new plant helped produce a clean break with old methods. In addition, planners were officially encouraged to "go beyond mere problem solving" and the elimination of "production problems that had existed."

Things to Avoid—At the same time, Westinghouse took steps to avoid an overdose of blue sky thinking. According to Mr. O'Donnell, plant planners can go overboard in two ways: They can spend too much money. They adopt schemes that are beautiful in theory but don't work in practice.

As a safeguard against financial excesses, Trafford planners followed the general Westinghouse standard that all capital projects must offer a 20 pct return on investment. Starting with a high degree of automation, proposals were whittled down until they gave the required payoff.

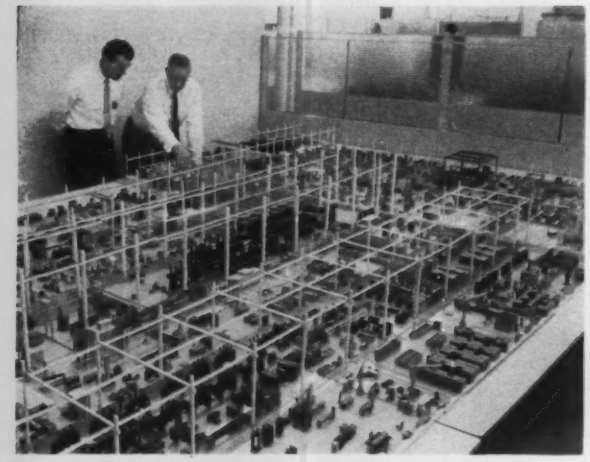
In every case, the proposal finally adopted was the minimum considered for an application. By working downward instead of upward, the danger of timid planning was kept at a minimum.

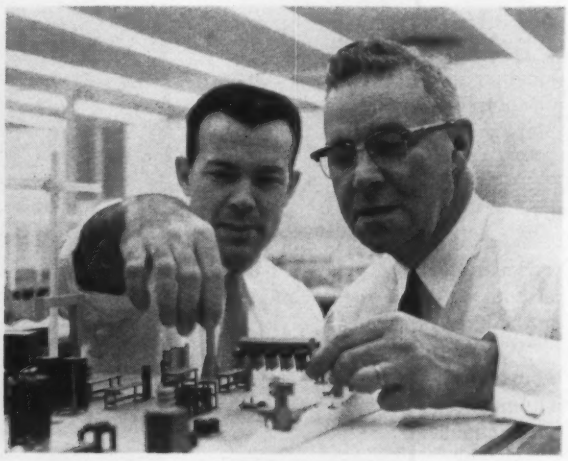
Give Foremen a Part—To avoid unsound gadgetry and provide a base of solid ideas, Westinghouse gave foremen key responsibility in its planning effort. Overall direction came from a superintendent of facilities planning, drawn from manufacturing. Detailed planning was carried out by 30 committees.

Each committee was assigned a specific area. A typical committee had an industrial engineer, a manufacturing engineer and the foreman responsible for an area. Operating on a floating basis were three specialists from company headquarters.

The foreman served as committee chairman. This arrangement gave weight to practical experience. It gave a strong say to the men who would have responsibility for operating the new plant. "When a man knows he'll have to live with an idea for years, he has a strong incentive to make sure it's a good idea," points out a Trafford manager.

Use 3-D Models—Mechanics of the planning projects were organized to permit broad participation. The engineers assigned to committees worked full time, preparing detailed designs and attending meetings. Plant foremen continued in





PLANNING IN 3-D: Checking three dimensional plant model used in planning are: W. W. Weber (left), superintendent, manufacturing engineering, and E. J. Gagliardi (right), manager, manufacturing.

their regular jobs at East Pittsburgh in addition to attending meetings.

The entire plant was designed with three-dimensional models; no conventional drawings were used. Trafford management feels the use of models was a great aid in a project that called for operating men to work out a completely new system of manufacture.

In the planning chronology, one of the first steps was an analysis of requirements. Trafford prepared lists of all the parts going into all 30 models of circuit breakers. This produced an average of 1100 separate parts per model.

Cutting the Deck — Punched cards were then prepared for parts. When the card deck had been sorted and common parts consolidated, it was found the manufacturing requirements could be boiled down to 3000 distinct components. Annual usage for each piece was estimated.

An operation research team at East Pittsburgh went to work on this data. The team devised an optimizing program for Trafford. It came up with a schedule of economic order quantities.

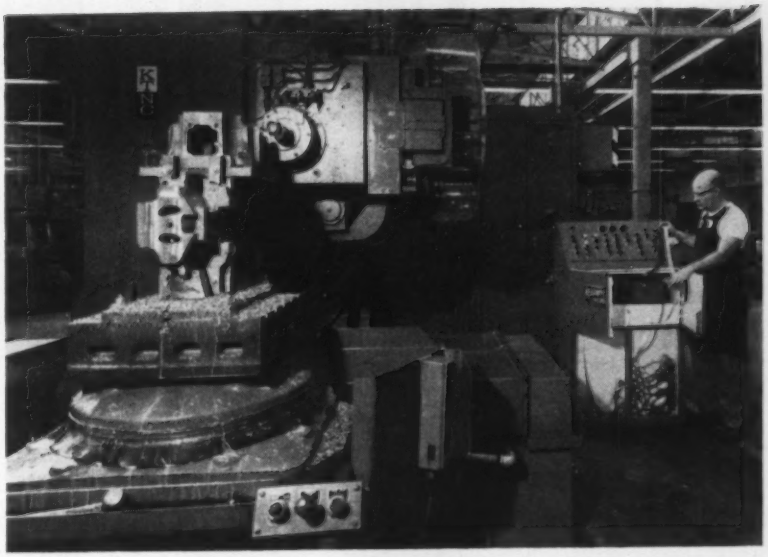
By combining common parts and by consolidating requirements over a period of time, Trafford was able to amass the volume for long production runs.

In terms of efficiency, the consolidation of requirements has brought spectacular savings. Reduced setup time for one machining operation has cut space requirements for the operation in half.

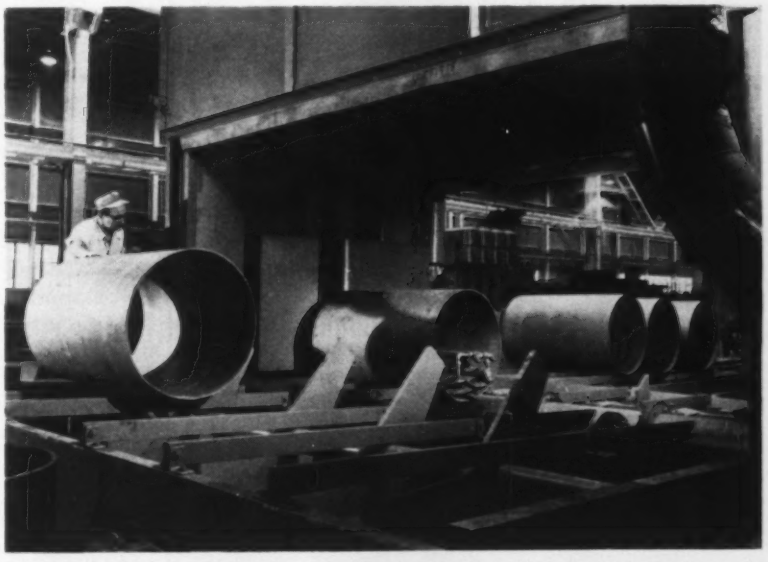
Retains Flexibility — Another type of analysis involved job simplification. The new plant puts circuit breakers together in an assembly line sequence. The project is broken down into successive work stations and simplified jobs.

Instead of blue prints, the worker has a list of written instructions. Parts flow to the station in carts that are specially designed to assure a full complement before processing starts.

The whole operation follows the principles of steady work flow with simplified and specialized jobs. At the same time, there is enough flexibility to meet varying requirements. Assembly lines have a number of stations that can be manned full time or as floating assignments. There is leeway to expand or contract as the work load changes.



FIVE IN ONE: Tape-controlled milling and drilling machine produces parts for high-voltage breakers equivalent to output of three conventional radial drill presses and two milling machines.



FINAL SEAM: Tank shell gets final seam weld at this semiautomatic work station. Shell rolls by gravity onto cradle rolls which operator rotates to position seam accurately under welding head.

Special Considerations — While Trafford has gone all out for automation, it has recognized the fact that certain operations simply cannot be automated. Most of the circuit breakers made by the plant enclose the interrupting devices in three separate tanks. A limited number employ a single tank only. For this special group, the equipment investment has been kept on a separate and modest scale.

Behind Alcoa's New Expansion

New Rolling Mills Take Aim at Growth Markets

New facilities planned by Alcoa are aimed at new growth markets for aluminum sheet.

A major goal is a big share of the market for metal cans for aluminum. New facilities will help narrow the price gap.

▪ Major changes in aluminum production, distribution and product mix are indicated by recent moves.

Aluminum Co. of America last week announced it will spend $18 million on sheet mill facilities at Davenport, Iowa, and Alcoa, Tenn.

Behind the Program—The program covers a new tandem cold mill for Davenport. New warehousing facilities are slated for both Davenport and Alcoa. Auxiliary equipment will round out the projects at both locations.

Alcoa says the program was caused by:

1. A need to provide capacity for expanding markets.

2. Need to meet the special requirements of new markets.

3. Need to adopt distribution to tonnage methods of production.

(For more on aluminum expansion plans, see p. 116.)

To Cut Costs—Key element in Alcoa's push is the four stand, four-high rolling mill. The company has been breaking in one of these at its Tennessee works for some time. The unit due for Davenport will be similar in design.

These are tonnage mills. Aloca is giving out no operating details, but it is no secret the company is shooting ultimately for rolling speeds as high as 5000 ft a minute. Aloca is out to bring its sheet finishing costs into line with those of steel.

For Growth Markets—In part, these mills represent a straight expansion of capacity. Growth of appliance, building, metal can and other markets have increased the demand for light aluminum sheet, says Alcoa. New market breakthroughs are expected to bring heavy new demands.

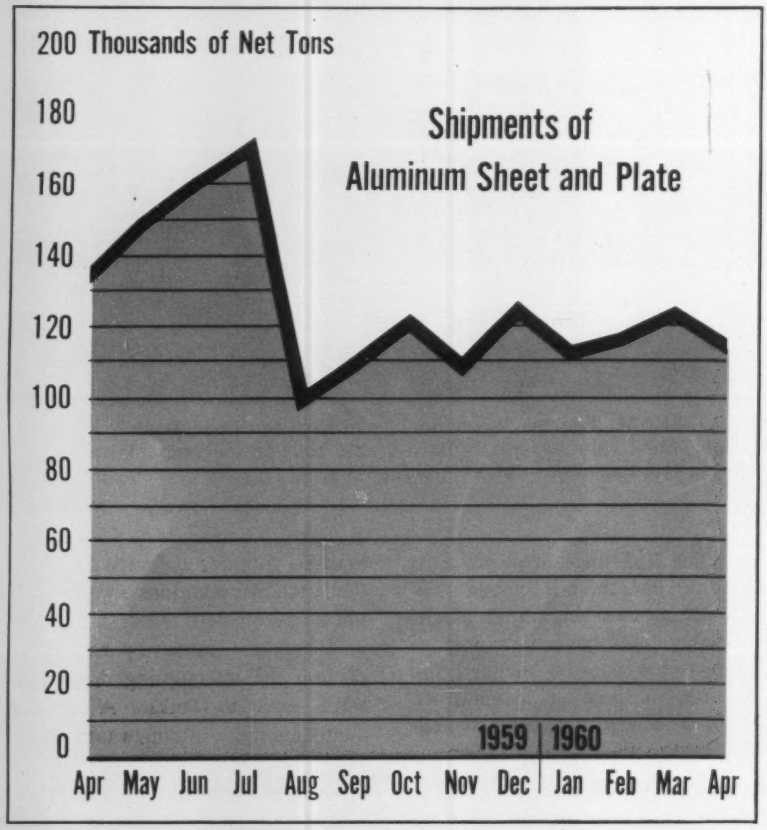
According to Alcoa, the new mills tie in with the thickness and quality requirements of growth markets. The Tennessee mill will take sheet down to .006 in. thickness. It will turn out finished sheet up to 36 in. wide. It is designed to meet needs of enamelers and others for good finish and uniform gage.

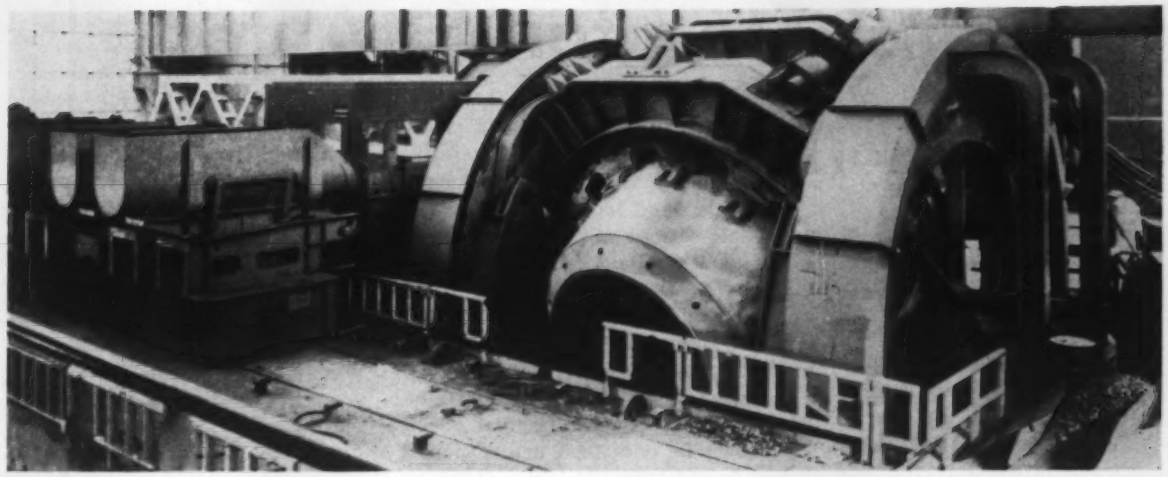
After Can Market—Another key requirement in new markets is low cost. In this respect, markets have offered both the incentive and the means. Speaking of the can market, one aluminum man says. "We can compete on cost with tinplate, but we must compete on the same terms." He explains that aluminum must have tonnage production equipment if it is to compete in a tonnage market.

The problem in the past has been that most aluminum orders were too small to make tonnage rolling practical.

In addition, the new system of mill warehousing will allow Alcoa to amass smaller orders without sacrificing service. Competitive requirements for fast delivery can be met by shipping out of stock.

Getting Ready for New Markets





ROTATING FURNACE: Stora-Kaldo vessel rotates on its longitudinal axis during the oxygen blow.

Kaldo Gets Big Test in France

Stora-Kaldo oxygen steelmaking process is showing up well in its first full-scale test.

Two 110-ton vessels are giving a high ingot yield of deep-drawing steels.—By G. J. McManus.

■ Big questions remain to be answered but the Stora-Kaldo oxygen steelmaking process is making a favorable impression in its big-time debut.

Two 110-ton vessels of the Stora-Kaldo type have been put into service at Sollac, France. Each is more than triple the size of the original unit at Domnarvet, Sweden. (First reported in the U. S. by The IRON AGE, Oct. 18, 1956, p. 126).

From what can be known so far, the new vessels are doing all that was expected of them, says Dravo Corp., Pittsburgh, holders of American rights to the Stora-Kaldo process.

The Big Test—The French furnaces are providing a full-scale, practical test. Sollac has only been operating its vessels since April and has been going slowly during the break-in period. Training crews have worked a single shift and melted a maximum of five heats a day.

Under these conditions, there is no opportunity to check production speeds and production economics.

Nevertheless, Dravo feels a number of significant points have been established. The Sollac vessels are being used to make deep-drawing steels. Starting with high phosphorus ores, the new units have produced ingots of .015 pct phosphorus or less. Low nitrogen and sulphur contents are reported. Drawing quality is described by Sollac as "extremely good."

High Ingot Yields—The matter of heat economy is considered vitally important by Dravo. In the Stora-Kaldo process, carbon is fully oxidized rather than passing off as carbon monoxide. Process backers have contended this feature makes extra heat available for melting scrap. It has been estimated a charge of 40 to 50 pct scrap could be handled.

Sollac has been using about 40 pct scrap plus some iron ore, getting ingot yields averaging over 90 pct.

In moving up to the heavyweight class, one of the biggest sales problems for Stora-Kaldo has been the fact that it employs rotary action. Steel producers have been willing to let someone else find out what would happen when 100 tons of iron and scrap are put in a vessel rotating up to 30 rpm.

Giving Answers—The Sollac facility has provided some of the answers. It has produced heats up to 122 tons. There have been no signs of serious structural problems.

There has not been an opportunity to test refractory wear. However, Dravo says the slag content indicates refractory consumption at the rate of 24 lb per ton of steel. Better wear is expected as operations progress.

More Coming — According to Dravo, the one big effect of the increase in vessel size has been to speed reactions. The larger diameter of the Sollac vessels has meant greater speed at the outer walls. This has brought a faster evolution of gas.

Three more sets of large Stora-Kaldo vessels are due for operation in Europe.

Plan Fast Start for '61 Autos

Automakers plan early changeover shutdowns followed by a fast production buildup.

They're accused of playing politics, but the reasons lie elsewhere.—By A. E. Fleming.

■ A big, fast production start and early public introduction for 1961 models are planned by U. S. automakers.

First closeout of 1960 assembly will come in mid-July, followed by the smallest output total of the year in August. Activity will step up quickly in September with some companies running at nearly full strength.

By October, production could be rolling at a record rate. A quick production buildup could very well mean the record 1,000,000-unit inventory of unsold new cars will still be around in the fourth quarter (see chart).

Fast Start — Leading the fastest new model getaway in some years will be Chrysler Corp., whose entire network of assembly plants will be turning out 1961 cars by Aug. 15. Following later in August will be Ford Motor Co., American Motors Corp., Studebaker-Packard Corp., and Buick.

A Sept. 6 startup date is planned by Pontiac, Oldsmobile and Cadillac, and perhaps Chevrolet although Chevy may be delayed a week. An exception to these plans could be Pontiac's compact Tempest which might be postponed until October.

Some 1961 models will go on sale in September. All, with the possible exception of the Tempest, will be available by early October. In contrast, the introduction period ran Oct. 2 to 29 last year. Mercury's Comet was put on the market in March, after a crash engineering program. Debuts lasted into mid-November for 1959 and 1958. models.

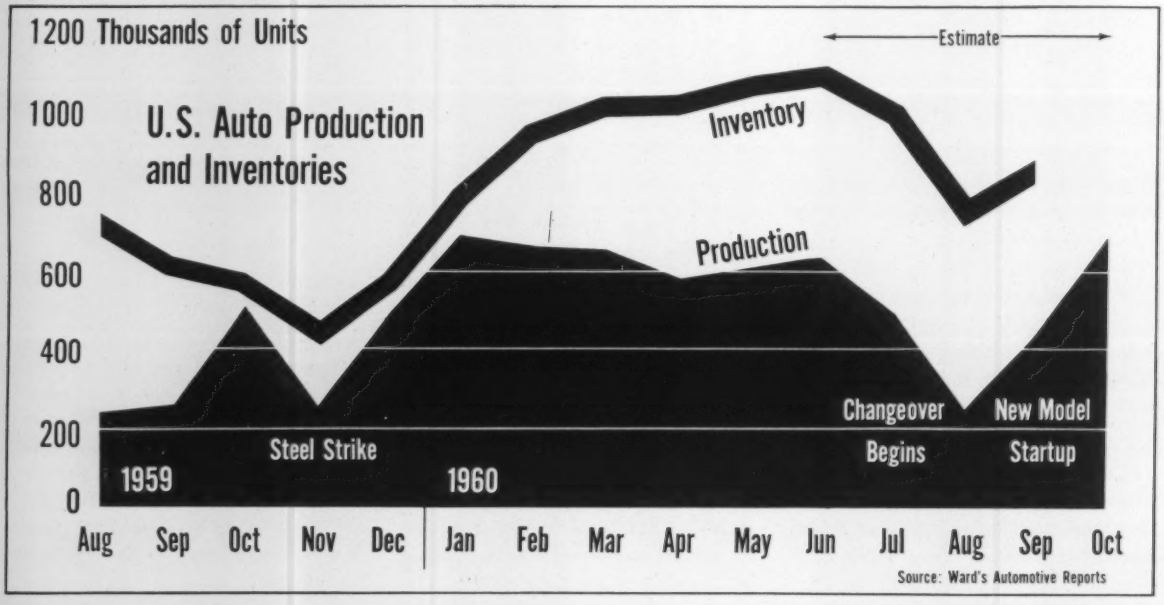
Record October? — The early startup and introductions are leading to reports of high October production schedules. If the current schedule of 685,000 units is carried out it would be the biggest October in history. Last October had 507,000 completions. The present record of 660,000 was set in 1950, only time the October total has actually topped 600,000.

The 685,000 schedule seems quite ambitious, perhaps unlikely say some steel suppliers and parts makers, especially in view of inventories. What seems to be shaping up, though, is quite a cut in 1960 model output in the third quarter. It's hoped that this will reduce the inventory from a June 31 count of over 1,000,000 to 350,000 unsold 1960 models at the end of September. This would be about the same number of "old models" as were in stock at the same time last year.

Politics and Production—But the sum of 1960 and 1961 models in inventory at the end of September will go to 850,000 if changeover closedowns, new model production and sales evolve as expected. By the end of October, the stockpile could again reach 1,000,000.

The prospect of this last week

Stocks and Output Reflect Changeover Plans



disturbed United Automobile Workers president Walter P. Reuther. He read political implications into October's production schedule. And he hinted automakers are setting the stage for a sunny economic climate that would make things rosy for Republicans just before the Nov. 8 election.

Action and Reaction — "Such production schedules and inventories at the start of a model year would represent a substantial borrowing from future production," he charged. "Following election day, output would have to cut back drastically with resultant large layoffs and extensive short work weeks."

The words were not received kindly by the Big Three. GM, Ford and Chrysler blasted back immediately and sharply. The companies pointed out that politics does not enter into new model production plans. Car scheduling is too risky and costly to be affected by elections. And production is necessarily high when new models come out in order to satisfy customer demand and give dealers an adequate supply of cars.

Timed for the Show—Chrysler emphasized its 1961 model public introduction dates were planned from one to four weeks ahead of last year, mainly because of the National Auto Show which will be held Oct. 15-23 in Detroit.

Although automakers did not mention it, a minimum of styling changes at some companies will also enable them to make fast changeovers, hold factory downtime to a minimum, and build up 1961 output smoothly.

Build a Bank — Justification for October's large schedule also may be found in the new compacts of Dodge, Pontiac, Buick and Oldsmobile.

They'll have to build up a good bank of compacts along with a normal number of standard models.

In October's impressive schedule they see an extension of this theory: Be well stocked and ready when the consumer comes calling.

Will Contractors Retain Patents?

New NASA law would give agency discretion over patents developed by industry on NASA work.

Congress appears to favor middle ground on issue of industry's rights on government contracts.

■ Who gets the patent, government or private contractor?

Around this question swirls one of the most complicated controversies in the nation's capital.

There are two conflicting policies. Under one, in most government agencies, the contractor retains patent rights on inventions developed under government contracts. Under this policy some agencies, like the Defense Dept., retain a license to use the invention though the commercial rights remain with the contractor.

Change Coming—Under the second, in the National Aeronautics and Space Administration (NASA) and the Atomic Energy Commission, the agency retains title to inventions made under research and development contracts.

Private contractors are about to get a break in research done for NASA. Under the new space act, passed by the House and almost sure to get Senate approval, the NASA patent policy will change.

The new law will allow the space agency administrator to use his discretion whether or not a patent can be awarded to the contractor. Before awarding a patent, however, he must first secure an irrevocable, royalty free license for the government.

A Compromise — The administrator's discretion will not be permissable in cases where some other law, such as that governing AEC patents, requires government ownership. Title will also be mandatory where the invention is necessary for the public welfare or national security.

This new patent procedure is a compromise. Some government people, such as Vice Adm. H. G. Rickover, want the government to retain most patents resulting from work it has financed. He is backed by several congressmen.

Middle Course — Industry men, also backed by quite a few congressmen, want freedom from any government control of patents.

The majority of legislators, however, seem to be in favor of some middle ground. This was shown in the House vote on the new space act. The act was passed by a vote of 235 to 31. But on a motion to recommit the bill to committee to have the new patent clause taken out and the old clause restored, the vote was 120 for recommital and 269 against recommital.

Thus, the new clause remained in the bill sent to the Senate.

Still Threatening — Those congressmen proposing legislation to give the government some title to ALL patents developed under government contracts now have their collective foot in the door.

They want the U. S. to get back some of its research expenditures, which now amount to $8 billion a year. Their target is the provision in research contracts which reserves to the contractor rights to these patents.

Backers of the proposed legislation contend the present system is building up huge patent monoplies for some companies.

Several studies are now underway in and out of government to try to straighten out the patent system.

Time to Speak Up on Tariffs

Hearings Give Industry Chance to Be Heard

Tariff hearings open July 11 on possible tariff concessions for foreign metalworking products.

Experts point out need of sound arguments if industry is to win points.—By J. D. Baxter.

■ More than 20 pages of metals and metals products are listed in products coming up for possible tariff concessions at the September meeting of the General Agreement on Tariffs and Trade (GATT).

This means there is a strong chance for even lower tariffs on a great many foreign metalworking products.

Big Cuts—And the tariff cuts can be hefty enough to hurt. U. S. negotiators, by law, can offer reduced tariff rates by as much as 20 pct (10 pct per year limit). Even now, U. S. tariffs are among the lowest in the world.

But U. S. metalworking has a chance to whittle down this list, or to have cuts modified. This chance comes at the public hearings slated to start in Washington on July 11 before the Tariff Commission and the Committee for Reciprocity Information (CRI). At these same hearings, industry can also ask the government to seek concessions from foreign countries.

Two Hearings — Actually, there are two hearings running concurrently. Appeals to the Tariff Commission are for relief on the basis of "peril points" investigations. These investigations by the commission try to determine the extent "to which concessions on listed products in the U. S. tariff may be made without causing or threatening serious injury to a domestic industry. . . ."

CRI hears views strictly on the GATT negotiations. It decides whether a product is to be added or deleted from the published list of negotiable products. While concessions from foreign countries are sought by industry, most efforts by far are in questioning U. S. tariff rates on foreign products.

How well industry argues and appeals at these hearings can make a big difference in future competitive conditions for a lot of companies. A number of people who have taken part in such hearings in the past claim that too often many industries put on a sorry show.

Advice Given — Two men with a lot of experience are Nicholas Yaworski, chief of metals division of the U. S. Tariff Commission, and H. B. McCoy, president of the Trade Relations Council of the United States. They offer some worthwhile advice to industry representatives who plan appeals.

"In peril point investigations," says Mr. Yaworski, "we are interested in one main point: Has the domestic industry been seriously injured, or is it threatened with serious injury, as a result of concessions made to foreign countries, in turn resulting in greater imports?"

The division chief adds that, too often, industries miss this point altogether in their appeals. One of the most overworked themes, he claims, is presenting the case on the basis of differences in U. S. and foreign labor rates. While conceding some patriotic shock value, Mr. Yaworski says such a presentation does not necessarily prove injury to a domestic industry.

If You Argue the Tariff Issue:

1. Stick to the point. Is your industry seriously injured, or threatened with injury, due to increased imports stemming from concession made by the U. S.?

2. Be factual. Emotional arguments about foreign wage rates don't alone prove injury to your industry.

3. Don't misdirect arguments. For example, appeals based on dumping, patent infringement, or national security should not be made to the Tariff Commission or CRI.

4. Concentrate your evidence, in showing injury, on the main points the Tariff Commission is going to investigate as a result of your appeal. These are: A downward trend in production, employment, prices, profits, or wages. Or a decline in sales, an increase in imports, a higher or growing inventory. Or a decline in proportion of the market.

5. Distinguish between appeals. In "peril point" appeals made to the Tariff Commission, stick to the specific injury incurred. CRI appeals can be broader in scope as you show reasons to exclude certain items from GATT negotiation list.

6. Join with other producers. You then have a greater pool of information and judgment. Appoint a joint committee to present the appeal.

7. Have technical information. Technical people should be available. They can often lend expert testimony or answer technical questions.

Show Injury—Mr. Yaworski says that effective appeals are ones that stick strictly to the "injury" aspect. Explaining by the numbers, Mr. Yaworski points out:

"Suppose production in a given domestic industry declines by 100,000 units, while imports go up 25,000 units. This situation may still not indicate injury to this domestic industry due to imports and import concessions. Among other things, it can be due to changing consumption patterns, competing materials, or technological changes. No favorable escape clause (Sec. 7, Tariff law) finding would be rendered in such a case merely because domestic production is down and imports are up."

Nine Points — The Tariff Commission, in determining injury to a domestic industry through import concessions, gives special attention to these symptomatic areas:

A downward trend in production, employment, prices, profits, or wages in the industry concerned.

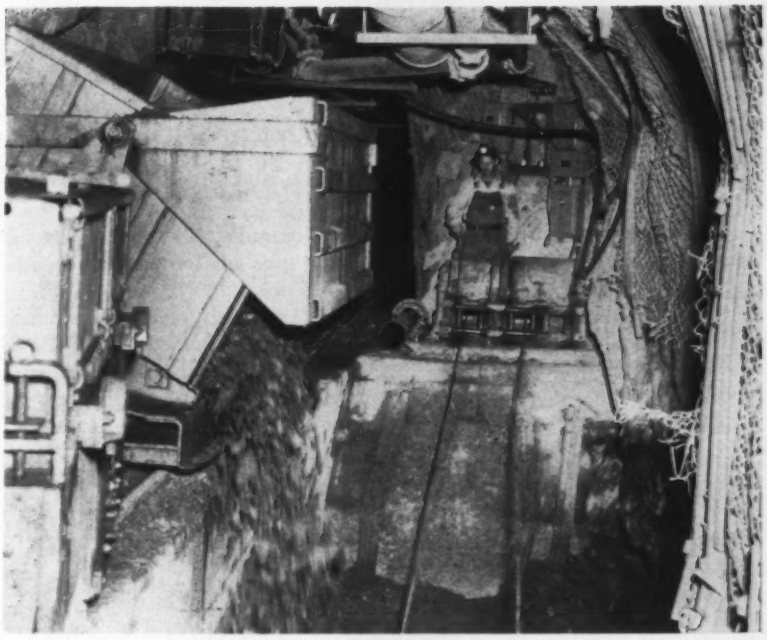
A decline in sales, an increase in imports.

A higher or growing inventory, or a decline in the proportion of the domestic market supplied by domestic producers.

No Crying Towels—Mr. McCoy, former chief of the Business and Defense Services Administration, advises industry to "get in and pitch" at the coming hearings. Crying towels in use later won't give the protection that a hard, sound appeal can do right now, according to the association head.

The Trade Relations Council, headed by Mr. McCoy, represents several hundred companies, trade and industry associations, and agricultural groups.

Appeals on the basis of the GATT negotiation list made to the CRI, Mr. McCoy points out, can be broader than those made to the Tariff Commission for escape clause rulings. Mr. McCoy explains that the CRI is interested in concessions from foreign countries as well as knowing effects of U. S. tariffs.



UP AND OUT: At the 1680 ft level, ore and rock is hauled by electric trains to this dump pit for removal to the mine surface.

Missouri Ore Comes In

■ First samples of high-grade magnetite iron ore are being brought to the surface from a deep shaft in Missouri. First struck at the 1680 ft level June 4, early specimens tested better than 60 pct.

Mining project is a $40 million combined venture by Bethlehem Steel Co. and St. Joseph Lead Co.

Big Ore Body—Earlier surface core drillings revealed the presence of a 100 million ton ore body, says James D. Idol, director of the Resources and Development Commission. And, he says, first shaft explorations may prove up even more tonnages.

Probes reaching 3000 ft are still in the ore, justifying the sinking of the shaft to that depth, officials say. At the 1680 ft level now reached, more core drillings will be made.

Investigation—Resident manager of the mine, E. L. Bilheimer, says, "We feel confident of having 100 million tons now, but we want to conduct further explorations underground to see if the ore body is even larger."

A second shaft, for the main recovery of the ore, has been sunk to the 1131 ft level. It, too, will go down to 3000 ft. The shafts, encased in reinforced concrete, are 22 ft in diam.

On the Way—A $3 million spur line from Cadet, Mo., to the mine site, near Sullivan called Pea Ridge, is being built by the Missouri Pacific Railroad. It will be 25 miles long, and at present is only eight miles from the site. A 200 car freight yard has been built to handle the estimated 100 car loads of beneficiated ore that will leave the mine daily when the project is in full operation in 1963.

A beneficiating mill will be built at the site. It will process and refine the ore, and by a highly complex operation, produce a marble-sized, high-quality pellet.

Pure Aluminum Output Expanded

Kaiser to Triple Capacity This Year

High demand for high-purity aluminum has spurred Kaiser Aluminum & Chemical Co. expansion.

New uses will call for greater production in the next few years, industry sources say.

■ By the end of the first quarter this year Kaiser Aluminum & Chemical Co. had committed all its super-purity aluminum output for the entire year. The company decided if the market was that good it ought to do something about it.

The company is adding six new, largest-of-their-kind, refining cells at its Mead, Wash., plant. Production in the new cells, that will triple capacity, is expected to begin in September.

More Than Ever—Each of the new units will have an annual capacity of 360,000 lb., making the company's total super-purity aluminum capacity over 3 million lb.

This about equals total domestic capacity in 1959. Spurred chiefly by the Kaiser expansion, domestic capacity in 1960 will be about 7,560,000 lb.

The Process—High-purity aluminum is at least 99.99 pct pure, with the remainder usually very slight traces of silicon, iron and magnesium. It is made in special cells with commercially pure (99.5 pct) aluminum as the raw material.

The biggest market for super-purity aluminum is as a catalyst in refining oil. Kaiser says it played a major role in the development of 100 octane gasoline. But this market will be relatively less important in the future.

New Markets — Also, several other markets are growing rapidly. Particularly, high-purity aluminum foil for radio, TV, and electronic capacitors; and for trim and decorative uses.

A large part of the high-purity aluminum consumed in the U. S. is imported. One source suggests imports make up over 50 pct of the supply.

The current tight market started to develop late in 1959 when Norway, a major producer, ran low on water, and thus power, for making super-purity aluminum. It has been aggravated by the sharp growth of some markets.

Some Doubt—Kaiser says its new capacity should take the strain off the market. Other sources aren't quite sure.

Electronic sales are growing in direct proportion to the growth of this industry. And this is substantial.

The development recently by Fromson-Orban Inc., an importer, of high-purity aluminum diecastings has rendered forecasts of this market little more than guesses.

Big Future — One high-purity aluminum seller suggests the decorative market will at least double or triple in the next few years.

In direct contrast with most other metal markets, imported high-purity aluminum does not have the edge in price. In fact, an importer insists that, in many cases, domestic refiners and fabricators are underselling imports by as much as 10 to 20 pct.

Refractory Metals Warehouse

■ Fansteel Metallurgical Corp., announcing its first refractory metals warehouse, indicates it has several tons of four high-temperature metals, and their alloys, in its reserve stocks.

The total, while small by most metal inventory measures, makes Fansteel's stocks the highest on the North American continent. And it represents an important capital investment.

Order Book—The North Chicago firm will offer tantalum, tungsten, molybdenum, and columbium, as well as alloys of the metals. All figure in missile and rocket motor development. And they will probaby be used in the development of higher temperature atomic reactors.

Stocks include tantalum sheet in thicknesses from ⅛ in. down to .005 foil. Molybdenum wire is available down to .020 diam. Tantalum wire of .002 diam will be carried in stock.

Rapid Climb — Fansteel began shipping on a warehouse basis four weeks ago, and reports business has gained about 50 pct in that period. The firm offers off-the-shelf delivery, will offer the material in a wide range of shapes and sizes. Orders have been shipped in as little as four hours.

A California customer placed an order for a refractory metal. He was able to put the material to work in his plant 18 hours later.

Dr. Frank H. Driggs, Fansteel Metallurgical Corp. president, says, "With the ever-increasing tempo of vital defense work, Fansteel's warehouse reduces the time lag in critical research and development work on prototypes, and enables a more rapid start of regular production lines."

Griswold A. Price

He's a Top Steel Salesman

Gris Price is one of the best known steel men in the Midwest where he heads sales for U. S. Steel.

He is an energetic and enthusiastic salesman, and keeps a pace that leaves younger men gasping.

■ Almost everyone who ever placed an order for steel in the Chicago area knows Gris Price.

He's a hard working, salty-talking, partisan steel man. He's never worked anywhere but in the U. S. Steel Corp. organization and probably never considered any other course in his business life.

Valued Opinions—As a top steel salesman in the biggest steel producing and consuming area in the country, his opinions on the steel market are valued by everyone in the business. And when he gives an opinion everyone within earshot knows where he stands.

He started his career as a student in the Gary Works after he was graduated from Northwestern University in 1919. A year later he was transferred to the Chicago office. There he served in a number of jobs before becoming a salesman in the bar, strip and semi-finished materials division.

Top Man—In 1931 Mr. Price was named assistant manager of sales for St. Louis. A spirited salesman, he was named manager there three years later.

And that same year he returned to Chicago as assistant general manager of Illinois Steel Co. This time he was in charge of the bar, strip and semi-finished materials division. When the Carnegie—Illinois Steel Co. was formed a top quality man was needed to sell the new product line in the nation's steel center. And Mr. Price was named sales manager for the Pittsburgh district.

He remained there until 1939 when he was appointed manager of sales of the Chicago district sales office. He became manager of that office in 1947. His appointment to assistant vice president, sales, western area of U. S. Steel, the position he still holds, came in 1955.

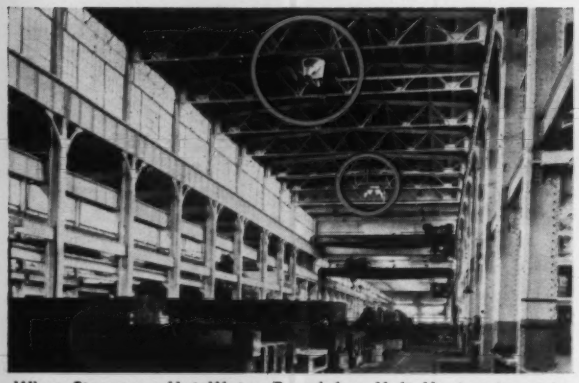
Who's Who—One of Mr. Price's strong points is a long and firm association with just about everyone in the Chicago area who uses steel products. He's a traveling seller. He gets out into the field a great deal and seems to spend as much time in making personal contacts as any of his own salesmen. His list of first name friends includes most of the steel buyers in the Midwest, and he's worked with them through enough years to know their problems as well as he knows his own.

G. A. PRICE: A partisan steel man.

He can hit a pace that leaves younger men in the field gasping. He has an abundance of energy and devotes a lot of it to his job. His wide list of contacts give him a pretty keen sense of where the economy is going, and why.

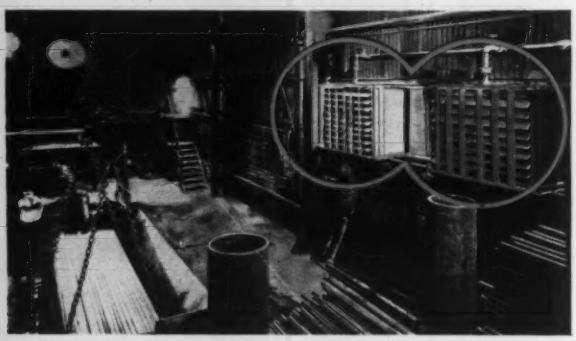
Mr. Price is very active in many civic and business organizations in the Chicago area. He is a member of the Chicago Club, the University Club of Chicago and the American Iron and Steel Institute.

He is the father of two married daughters. Mr. and Mrs. Price live in suburban Winnetka, Ill.

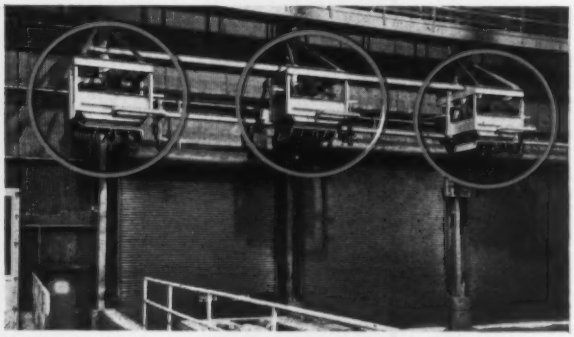


Wing Steam or Hot Water Revolving Unit Heaters operate efficiently from all mounting heights—distribute heat evenly and around obstacles—eliminate hot blasts and cold spots. Air is continuously on the move for greatest worker comfort.

Wing Gas-Fired Revolving Assemblies assure all the economies in installation and operation offered by gas fuel. Units use fuel only when and where heat is needed. Can be located safely above traveling cranes and other equipment.



Wing Fresh Air Supply Units draw outside air into building through roof or wall and heat it with steam, hot water or gas. Inside air is kept fresher, workers more productive. Efficient operation of exhaust systems and combustion equipment results from balanced air pressures.

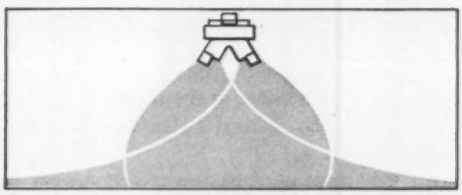


Wing High Velocity Door Heaters are the only ones specifically designed for blanketing opened railroad and truck doorways with a curtain of heated air. Desirable indoor temperatures are maintained for better, more healthful working conditions.

WING HEATERS solve metals industry heating problems

Wing heating equipment—Revolving Heaters, Fresh Air Supply Units, Door Heaters and other equipment—in many installations have proved their suitability in metals industry operation—steel plants, fabricators and warehouses. They are economical—because of greater coverage; fewer heaters are usually needed; heated air is recirculated; maintenance is low.

Write today for your copy of our new brochure, Wing Heaters in the Metals Industry, which will soon be off the press...or request bulletin for each type heater.



Drawing shows how Wing Revolving Heaters project warm air to floor level and distribute it to large areas. This not only assures a comfortable working atmosphere, but also provides maximum protection for stored metals against corrosion.

L. J. WING MFG. CO.
DIVISION OF AERO SUPPLY MFG. CO. INC.
195 VREELAND MILLS ROAD, LINDEN, NEW JERSEY
FACTORIES: LINDEN, N. J. AND MONTREAL, CANADA
IN EUROPE: WANSON, HAEN-NORD, BRUSSELS, BELGIUM

WING

What Do Your Customers Need?

Companies that are sensitive to their customers' demands are out in front in competition.

New products and attention to consumer needs will be big factors in competitive period ahead.

■ It's a disappointing fact that sales of many consumer durables aren't up to expectations.

Part of the poor showing comes from unrealistic high hopes at the start of the year. These make the current sales picture look even worse than it is when compared with the early forecasts.

Stocks to Liquidate — Over-optimism led manufacturers to build up high inventories. Now they have to be liquidated. This is resulting in production cutbacks, layoffs, and major slashes in inventories of parts and materials.

The appliance industry is a typical example. Last week, R. H. Quale, Jr., president of Norge Div. of Borg Warner Corp., called the situation serious.

The Real Causes — But Mr. Quale faces up to what he believes is the cause. One reason for the poor sales, he says, is "a lack of revolutionary product development." Another, he adds, is that the industry is not responding to consumer demands.

In his own industry, Mr. Quale cites consumer demands for longer lasting appliances and relief from excessively high service costs.

The point here is not to analyze the appliance industry's problems of durability and service. Instead, it is whether Mr. Quale's points can apply to other lagging industries.

New Products Needed — Taking product development first, you can't deny that industries doing the best today are helped by new products. For example, although you can get arguments on the point, it has to be recognized that the auto industry would be flat this year without the new compact cars. If anything, automakers could have recognized earlier that the consumer demand was there.

And the leading companies in basic materials, where the consumer demand may be more difficult to recognize, are developing new products for markets that were never considered a few years ago.

To Meet Competition — The companies that move ahead in the coming period of severe competition are those that are alert to the demands of their consumers. And many of these demands are not recognized as yet by the consumer himself.

If Mr. Quale recognizes that product durability and good service are the first demands of his customers, it should be possible for you to find out the demands of your consumers. It will take more than a top-level hunch. It may take some expensive searching, and developing.

And the same line of thinking applies to new products. The old ones, even improved, are not going to move in the years ahead.

Some Indicators Are Shaky

■ It's becoming clear that business is going to need a push if it is to avoid a potentially serious drop this year.

So far, the decline is confined to specific industries, like steel. Good arguments can be made that when the period of "adjustment" is over, things will be back on the upgrade.

Not Yet, But — Overall, the economy is holding its own. But some shakiness is noted in the sensitive indicators. Some have not held up their earlier levels. Others have held their own, but better things were expected.

Durable goods new orders are, at best, holding their own. Residential building is not coming up to expectations. Working hours are declining. These are some of the indicators that tend to move ahead of general business.

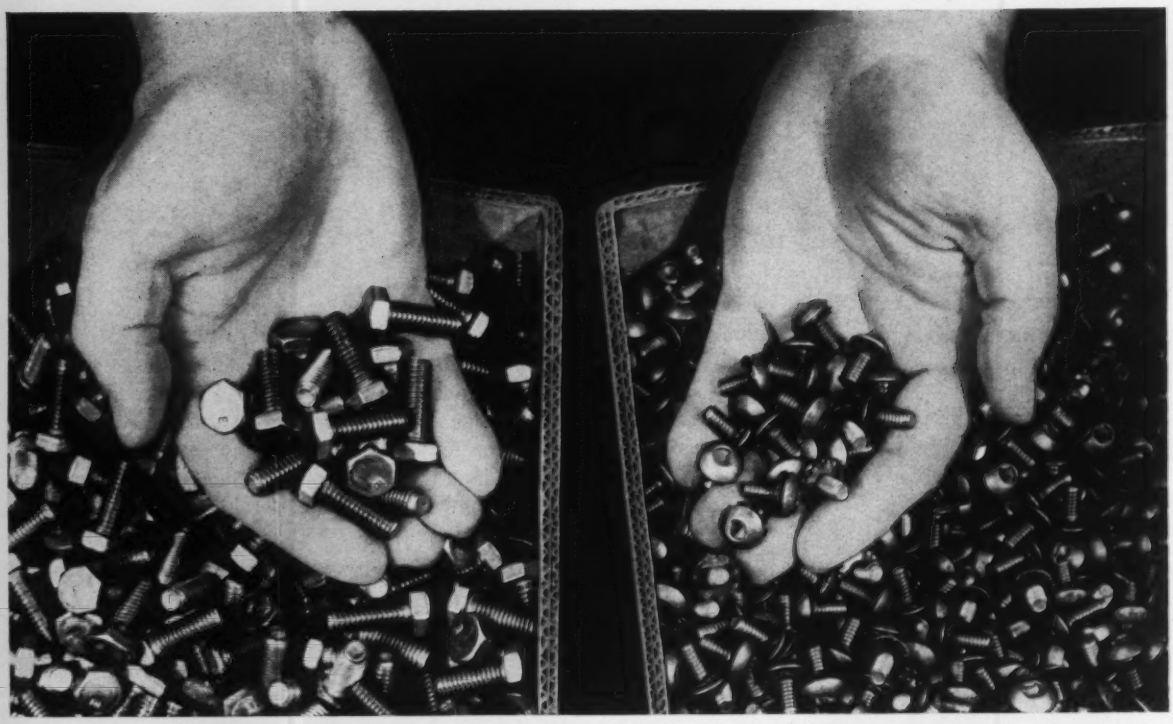
Indicators—The Mellon National Bank and Trust Co. uses a composite of what it considers eight early moving indicators. The index for April was 124, compared with 128 in December of 1959. The decline has been moderate, only four points, but fairly steady.

It would be difficult to estimate the current composite, but it must be well below the 134 points of a year ago.

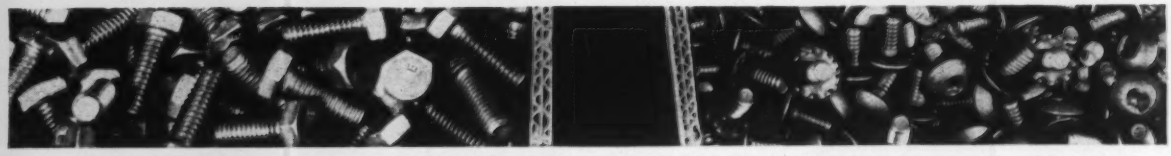
Carbuilding Drops

Railroads, sensitive to business conditions, particularly in heavy industry, are pulling in their horns on car building. Not that they were ever too far extended.

New cars ordered in May totaled only 2234. This compares with 5551 in April and 5203 in April, 1959. The backlog of cars is now down to 17,714.



Picks up $97,000 saving in screws



Fastener survey by RB&W cites big saving in simple substitution of fastener types . . . no engineering changes needed

There were no engineering changes at all involved in this hard-to-believe case of cost reduction. The RB&W Fastener Man, called in to survey the use of fasteners in this particular company's machine, was asked to submit recommendations on a size for size substitution only.

Annual production consumed about 1½ million fasteners. Since the RB&W fastener specialist saw neither a design nor appearance reason for the costly alloy fasteners being used, he suggested (1) clutch head screws to replace the existing alloy screws; (2) standard bright and high carbon hex screws to be used at all other locations. Just that simple. At prevailing prices, costs of parts studied totaled $120,000; cost of the suggested fasteners: only $23,000 . . . a whopping, realizable $97,000 saving. Pure profit!

Are you *sure* you're not wasting fastener dollars? True, the savings offered may be more modest than the special case above. But they're certainly worth looking for through the eyes of an RB&W fastener expert. No obligation. Write Russell, Burdsall & Ward Bolt & Nut Company, Port Chester, New York.

RB&W
115th year

Plants at: Port Chester, N. Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. Additional sales offices at: Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco. Sales agents at: Cleveland, Milwaukee; New Orleans; Denver, Fargo. Distributors from coast to coast.

Makers Downgrade Middle Lines

Big Cars Will Also Have Smaller, Lower Priced Models

A few years back, the low-priced lines invaded the levels of the medium price group.

Dodge retaliated this year. Now others plan to make the move for 1961.—By A. E. Fleming.

■ Mercury and Pontiac will drop into the price range of standard Chevrolets, Fords and Plymouths in the 1961 model year.

They will offer models priced between the Mercury Comet and Pontiac Tempest compacts and the lowest priced models of their present standard lines.

Included in Mercury's plan is a 6-cylinder engine. It will be the first ever marketed by the producer. There are reports also that a Pontiac Six is on the way in standard 1961 models. It would be the first for the division in eight years. But there is more than casual denial of this by Pontiac.

Taken by Surprise—The partial step-down by Mercury and Pontiac into direct competition with Chevrolet, Ford and Plymouth is not original. Dodge beat them by a year with the Dart. And Dart's success is sending Mercury and Pontiac to action.

The Dart's appeal can't be denied. With a 118-in. wheelbase and optional 145 hp Slant Six engine, it has become something of a sales rage along with the compacts. It is believed to account for 80 to 90 pct of Dodge sales. This leaves only 10 to 20 pct for the larger, more powerful and costlier Dodge Matador and Polara models. Economy-mindedness of Dart buyers is shown by the fact that about one-third of the sales are 6-cylinder models.

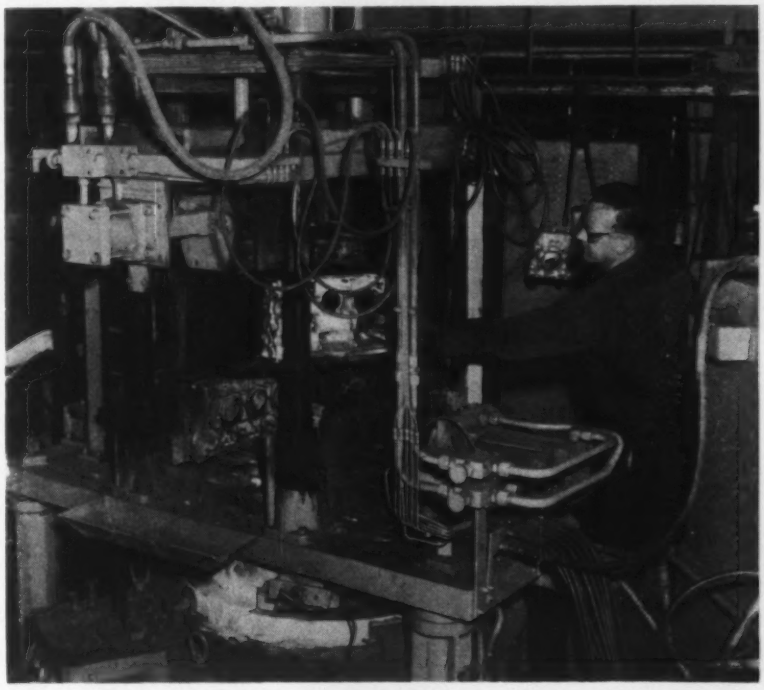
What's in a Name?—Neither can anyone deny the Dart has not stolen some sales from Chevrolet, Ford and Plymouth. The Dodge name still hints of middle-class prestige. At a price $50 above Plymouth, the Dart is an attractive package for those looking for a prestige name at a relatively low price.

Mercury and Pontiac realize this. And by adding their "prestige" name tags to the low-price market, the pressure on Chevorlet, Ford and Plymouth will be even greater in 1961.

But as Dodge, Mercury and Pontiac squeeze into the low-price field, they are expected to give up a model or so at the other end of the line. Dodge will drop a higher-priced series in the fall, likely the Polara. Mercury's expensive Park Lane series is expected to fade away. Pontiac may not retire any series names, but the cars will be built on shorter wheelbases in 1961.

Smaller Big Cars—Pontiac plans a 119-in. wheelbase for the model that will line up against Chevy-

Foundry Casts Aluminum Engine Parts



CAST SYSTEM: Workman removes a right half crankcase casting from a mold at Chevrolet Aluminum Foundry, Massena, N. Y. The facility produces aluminum castings for the Corvair engine. Major ones are: Right and left castings for cylinder heads and the crankcase; transmission case, rear engine housing, clutch housing, and pistons. Foundry has produced castings for 225,000 engines in the past year.

Ford-Plymouth. The 1960 Chevy and Ford have 119-in. wheelbases, the Plymouth 118 in.

Pontiac is scaling the wheelbase of its higher-priced models at 123 in. This compares with a present 122 in. on the Catalina and Ventura and 124 in. on the Star Chief and Bonneville.

Mercury is making another significant move in 1961, one that Dodge is expected to follow in 1962. Mercury will use the same body shell as Ford next fall. Dodge may share the Plymouth shell a year later.

Smaller Price Tags?—The smaller shell indicates a smaller car for Mercury in all series. At least one, perhaps two, series of Mercurys will compete in the Chevrolet - Ford-Plymouth range. Only simple sedan styling, no hardtops or convertibles, is likely to appear in the low-price Mercury series.

Mercury's proposed 6 - cylinder engine will not be new. From brief description, it appears it will be the one used by Edsel before its departure last fall. It is a 145 hp, inline, overhead valve powerplant. Low-priced Mercurys also will offer a V-8, presumably the 185 hp V-8 now used in Ford Fairlanes and Galaxies.

The moves by Mercury and Pontiac into lower price classes mean lower prices are on the way. The Dart Seneca Six sells for a suggested factory list price just under $2300 including federal taxes. To meet this, Mercury would have to price the 6-cylinder car about $350 below its present lowest-priced model.

It Pays to Buy S-P Stock and Cars

Studebaker-Packard Corp. in recent months has been chipping away at a bulging new car inventory through four-day work weeks and brief closedowns at its South Bend assembly plant.

Now a more original way to clear out some 1960 models during the approaching and highly-competitive summer selling season is in the works. The company is turning to its stockholders.

In what is believed to be an industry "first," S-P is giving nearly 20,000 stockholders a chance to buy Studebakers on a preferential basis.

Special Dividend—Owners as of June 20 of one or more shares of S-P stock who buy a 1960 Lark, Hawk or Champ truck during July, August or September can get a $100 refund from the company.

According to H. E. Churchill, S-P president, the refund is a special inducement to make it easier for stockholders to own and help promote Studebaker products. Many stockholders have reportedly expressed interest. The company is now mailing out details of the plan.

Through mid-June, S-P turned out 60,000 cars in calendar 1960 compared to 85,000 a year earlier. Its share of U. S. production has fallen below 2 pct from nearly 3 pct last year. Although calendar year sales are lagging behind a year ago, 1960 model year sales are ahead of 1959 sales for the same period.

T-Bar Seat Springs

Torsion bars, a suspension system used on Chrysler Corp. cars since the mid-1950's, are going into a new truck seat that will be marketed by Bostrom Corp. in September. The same spring action principle of a twisting metal bar is applied to the new Viking Torsion-Bar seat's suspension mechanism.

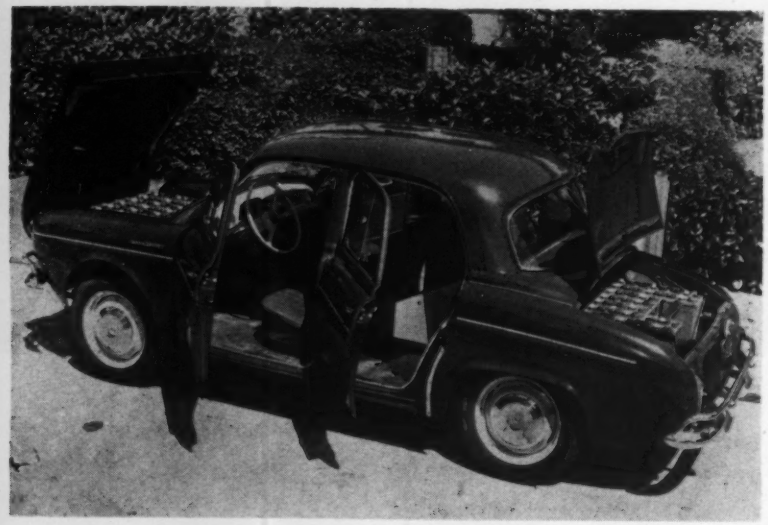
A major feature of the seat is its low overall height, reduced 40 pct including the base suspension mechanism. This is in line wtih the modern low-cab design of major truck makers.

The seat will start going into trucks as factory - installed equipment in September. It will also be offered as a replacement seat for present trucks.

Cost of Comfort—About 95 pct of the Milwaukee company's suspension truck seat sales is original equipment. They cost from $55 to $65 extra as an option, according to Bostrom officials.

Market for the seat is aimed generally at producers of trucks weighing 16,000 lb gross vehicle weight and over.

Electric Car Uses Import Body



CHECK THE BATTERY: Eureka Williams Corp.'s new "Henny Kilowatt," an electric auto, uses a Renault Dauphine body. Conventional engine is replaced by a battery powered, 72-volt traction motor specially designed by General Electric Co.'s Direct Current Motor and Generator Dept. At present the vehicle is sold only to utility companies.

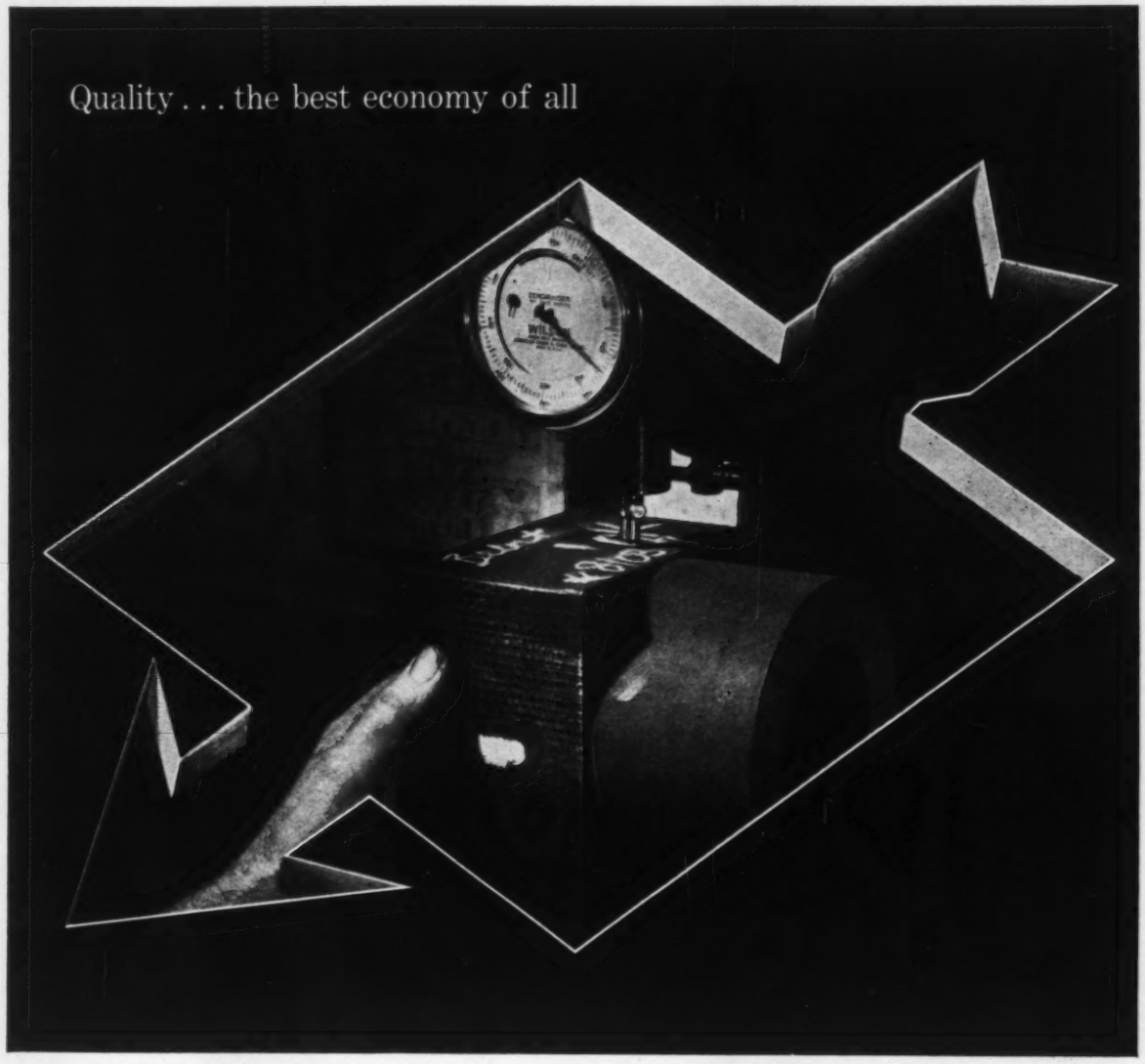


Photo courtesy of J. W. Rex Corp.

To hit the exact qualities you want . . . you need a choice of quenching oils

You can *get by* with just one quenching oil. But you can't always get the *best results* . . . not when you measure quality to a fine degree. Very often, you need a choice.

Sun makes quenching oils to reduce cooler-maintenance costs... oils with high antidecomposition qualities... oils for fast-quenching operations . . . oils for marquenching... and other "specials."

See your Sun representative for help in evaluating your quenching needs. He'll show you how to save money while maintaining quality . . . the best economy of all.

SUN OIL COMPANY, Philadelphia 3, Pa. Department IA-6. In Canada: Sun Oil Company Limited, Toronto and Montreal.

SUNOCO

MAKERS OF FAMOUS CUSTOM-BLENDED BLUE SUNOCO GASOLINES

NEW...

with capacities to 50 hp!

LINK-BELT

RS P.I.V.

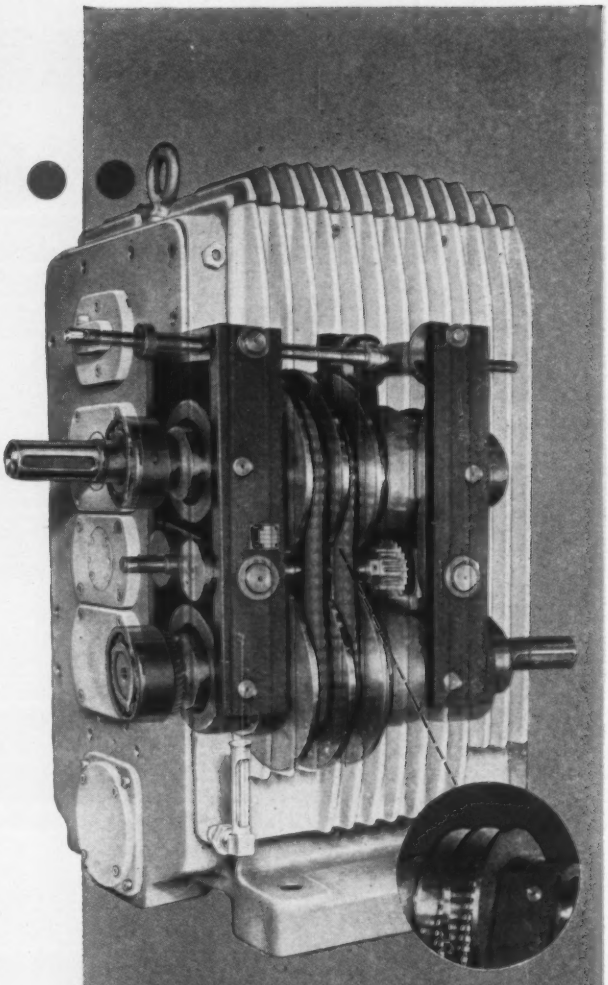
VARIABLE SPEED DRIVES

All-metal drives use single-roll chains to achieve positive, stepless, infinitely variable speed control

With a unique chain design and force lever system, Link-Belt RS P.I.V. drives represent a major advance in direct-drive variable-speed transmission. It's the most compact mechanical 50 horsepower variable speed drive on the market.

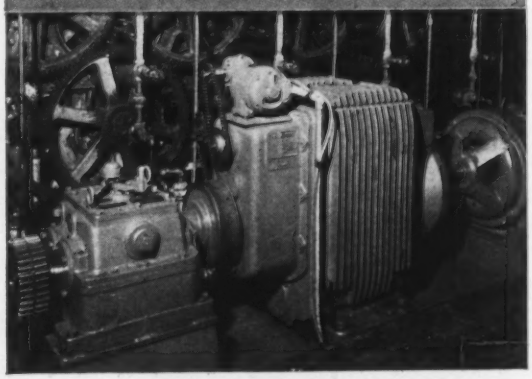
Twin strands of high-load capacity chain operating between opposing conical wheels permit extreme compactness. The effective diameters of the wheel faces are altered during operation, changing their ratio and the output shaft speed accordingly . . . providing smooth, positive, accurate speed adjustment between maximum and minimum settings. Constant hp or torque is maintained over the complete speed range.

Link-Belt RS P.I.V. drives are all-metal and pressure-lubricated. Capacities to 50 hp, with speed variation ratios up to 5.5:1. For full details, contact your nearest Link-Belt office or authorized stock-carrying distributor. Ask for new Catalog 2874. 15.366



RS-33 P.I.V. with twin chain arrangement for capacities to 50 hp. Inset shows close-up of unique all metal single roll chain construction.

47-ROLL PAPER-MAKING MACHINE uses Link-Belt RS P.I.V. on primary drive. The RS P.I.V. powers a two-speed gear drive which enables paper speeds to be varied over two ranges . . . 4 to 16 yards per minute and 12½ to 50 yards per minute.



LINK-BELT

P.I.V. VARIABLE SPEED DRIVES

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Warehouses, District Sales Offices and Stock Carrying Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World.

More Dollars Head for Defense

Budget Calls for More Military Spending

"Gun rattling" in the Soviet has prompted Congress to speed up defense spending on all levels.

Missile and satellite makers will get the big share, but others will also prosper. — By G. H. Baker.

■ Defense spending, which has been nudging forward at the rate of about $1 billion a year in recent years, will accelerate sharply in the months ahead.

The Soviet Union's new "period of harassment" (as the Pentagon calls it) is to blame. Some substantial increases in procurement are planned.

Something for All — Firms engaged in fabricating missiles and satellites will benefit most. But extra dollars are being budgeted for all types of conventional military hardware as well (vehicles, machine tools, for example). The stepped-up spending program will be felt by nearly all defense contractors and subs.

The new defense money bill for the year starting July 1 provides about $40.5 billion, up by slightly more than $1 billion from the White House request.

Important Additions — Here are some of the significant additions to the defense procurement program, on the basis of nearly-complete congressional action on the giant money bill:

An extra $83.8 million to speed engineering and development of Samos, a sensitive satellite which bears a TV camera. Pilotless Samos can record much of the same information the piloted U-2 aircraft gathered.

Procurement of B-70 supersonic bombers, slowed in recent months to save money, is to resume on a "full speed ahead" basis.

Development of Bomarc (anti-aircraft missile) is to be resumed. Deep cuts had been ordered on Bomarc, following disappointing tests.

Underwater Power — More nuclear submarines will be ordered. This increase is both for the purpose of bolstering anti-sub warfare and also to provide more underwater bases for Polaris, the sub-fired missile.

Navy will probably make a start on a new super carrier. Admiral Arleigh Burke pushed hard for approval of the carrier, despite loud protests from missile-minded senators about "sitting ducks."

Gun Rattling—Army can count on continuing its 14 combat divisions and related combat units. A limited amount of modernization of equipment has won approval.

The higher costs, brought on by the renewal of gun-rattling in Moscow, cast grave doubts over earlier plans for tax reduction next year. And the outlook is for additional rises in procurement costs later this year.

Court Delays Union Dues Case

■ Use of compulsory union dues for political purposes by unions will continue to be legal for another year at least.

The U. S. Supreme Court will hold more arguments on the controversy next fall. A decision should come sometime next winter.

Called Unfair—Case stems from a section of the Railway Labor Act which sanctions union shops in the industry. Six employees of the Southern Railway complained that a part of the union dues they are compelled to pay under a closed-shop contract are used to support candidates and political doctrines which they oppose.

The Georgia State Supreme Court upheld the workers. It nullified the contract and held the section of the National Railway Labor Act unconstitutional.

Loss of Freedom—"One who is compelled to contribute the fruits of his labor to support or promote political or economic programs or support candidates for public office is just as much deprived of his freedom of speech as if he were compelled to give his vocal support to doctrines he opposes," the Georgia court said.

The U. S. Supreme Court held arguments on the case this spring. But it scheduled more arguments next fall when it found that the U. S. Attorney General had not had a certification that the constitutionality of the Railway Labor Act was at issue. Such certification is required when a federal law is at issue and the United States or one of its agencies is not a party.

For rigid requirements specify *flexible*

Copper Tube

Of course, copper tube is flexible in the sense that it forms easily. It is flexible, also, in its range of applications because the combination of properties it provides is not found in any other material.

For the finest quality copper tube, always specify Hussey . . . available straight or coiled in sizes, wall thicknesses and tempers to meet your most critical requirements.

HUSSEY COPPER AND BRASS TUBING & PIPE

•

Copper All Purpose Tube

•

Copper Water Tube (Types K, L, M)

•

Copper Refrigeration Tube (Dehydrated and Sealed Ends)

•

Copper Pipe

•

Brass Tube (also square, rectangular, hexagon)

•

Red Brass Pipe

Since 1848
HUSSEY
COPPER · BRASS

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C. G. HUSSEY & COMPANY

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PITTSBURGH 19, PENNSYLVANIA

7 Convenient Warehouses

PITTSBURGH CLEVELAND NEW YORK CHICAGO
ST. LOUIS PHILADELPHIA CINCINNATI

Convention Rush Hits L.A.

Democratic Candidates Woo California Delegates

Democratic convention is in Los Angeles for more than one reason. California's growth makes it a political battleground.

On the business side, new defense orders help out on the Coast.—By R. R. Kay.

■ The eyes of the nation will be on Los Angeles July 11-15. That's when the Democratic Party chooses its presidential candidate.

No matter who the nominee is, the National Democratic Convention will be one of the greatest shows on earth.

Greatest Coverage—It promises to be the most massively covered news event of all time. Some 5500 newspaper, magazine, radio, and TV reporters are trying to get credentials.

There's no doubt that the entire world will be able to read, hear, or see what happens at the convention.

The advance guard of kingmakers and politicians are already in Los Angeles. Party brass and workers are also on hand. They want to make sure that the convention wheels are well greased.

Get Out the Vote — The Farwest's industrial maturity is known the country over. And now its political importance is top rung.

The just-released census figures show that California has only one million fewer population than New York. That puts California in the No. 2 population spot.

The state now has 15.5 million persons. Gov. Edmund G. Brown heads an 81-man group—the largest uncommitted delegation. His influence in the smoke-filled caucus rooms will be potent. He's a man to watch at the convention.

Wooing Coast Delegates — Supporters of candidates Kennedy, Johnson, Symington, and Stevenson are bombarding Farwest delegates. To win their votes, they're wooing them with all sorts of promises.

Who will get the nomination? That's anybody's guess. But here's what competent political observers there think. The successful candidate for the nomination can't make it without the backing of the Farwest's delegates.

Good tip: If your business plans call for a Los Angeles stop during the convention, change them. Every hotel room is taken. Some delegates, officials, and their families are even quartered near Disneyland, 35 miles from the convention hall.

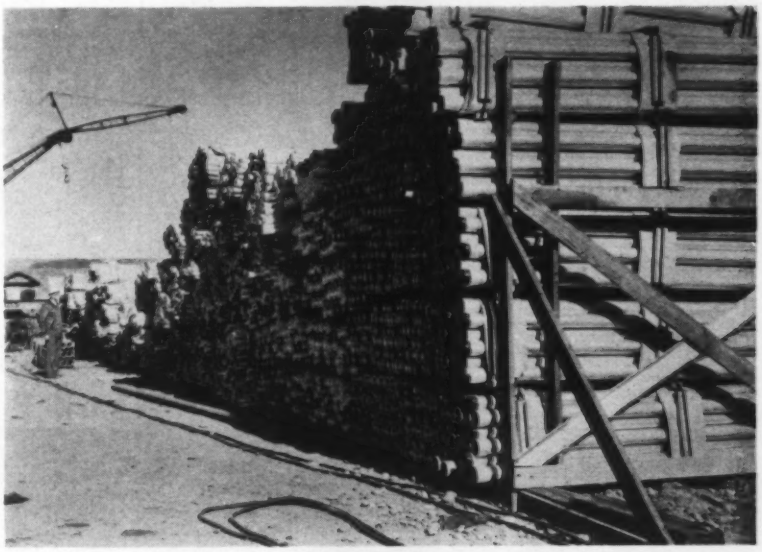
Coast Gets New Defense Dollars

Its pretty clear that the new high in cold war tensions is the chief reason for the beefed-up defense budget. More than one-half of the $1.2 billion added will go to West Coast aerospace companies.

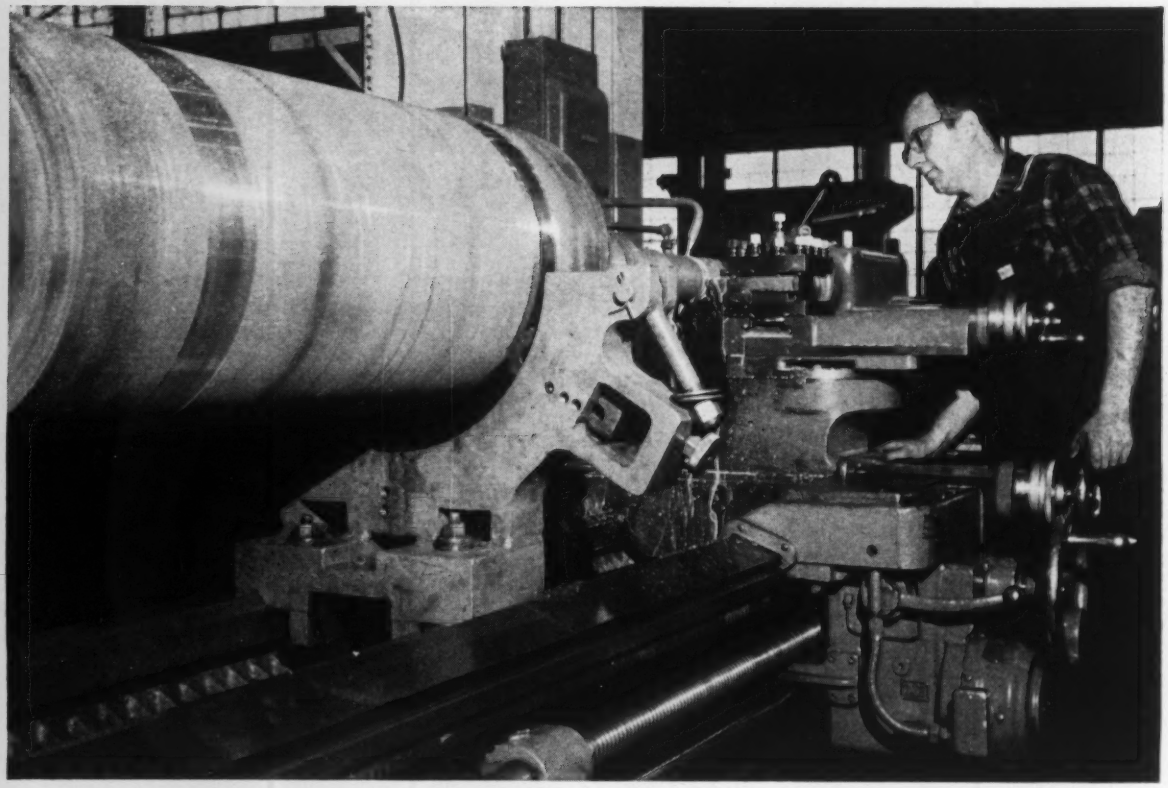
North American Aviation will get $300 million for faster development of its B-70 Valkyrie. That's the 2000-mph-bomber that will operate in altitudes between 70,000 and 80,000 ft. Range: 8000 miles.

Boeing is in line for $294 million for its Bomarc anti-aircraft missile.

New Dam Will Use Lots of Aluminum



BY A DAM SITE: About 38 miles of aluminum conduit will be used for the Wanapum Dam development near Vantage, Wash. Kaiser Aluminum and Chemical Sales, Inc., supplied the conduit which will be installed by Engineering & Construction Co. of Pocatello, Idaho.



RELIABILITY:

Reason enough to buy LeBlond

See LeBlond Booth 810 at the Machine Tool Exposition in Chicago, September 6—16.

Valuable as five fingers on a hand, these five great LeBlond lathes run round the clock, year in, year out, at the Warren, Ohio, shops of Wean Manufacturing Co. Wean has six LeBlonds in all, including the five in the picture, all purchased in the last five years.

The operations they perform are typically job-shop. Lots are small—five parts alike are a big run; materials may vary from hardened steel to copper. Fat mill rolls, long whippy spindles, sturdy stepped shafts—the rugged LeBlonds take them as they come and turn them quickly and accurately, regular as clockwork.

Much of Wean's output goes into steel mill equipment that can be relied on to hold up under the most exacting requirements—the same steadfast degree of reliability that LeBlond lathe customers expect, and get.

RELIABILITY is a good reason to buy a lathe. It is reason enough to buy LeBlond.

THE R. K. LeBLOND MACHINE TOOL COMPANY
Cincinnati 8, Ohio

LeBLOND *of Cincinnati*

Is More Safety Data Needed?

Lack of Feedback to Builders Hampers Safety Design

Machinery builders design safety into equipment—to the best of their knowledge.

But they often lack information as to its effectiveness in operation.—By R. H. Eshelman.

■ Safety is like money in the bank. Everyone is in favor of it. Trouble is that there's some question of how you get it.

A number of groups concerned with industrial safety were contacted for specific data on press and machining safety, for examples of industrial problems. None were able to come forward with detailed statistical information.

What then are the current accident trends in industrial plants? Are new machines and press showing improvement in practical operation? Are automatic machines safer or more hazardous than hand operated ones?

No Feedback—The machine tool industry and machine designers specifically have placed great emphasis on safety in recent years. Yet, apparently, there's little feedback of information from industry to guide them.

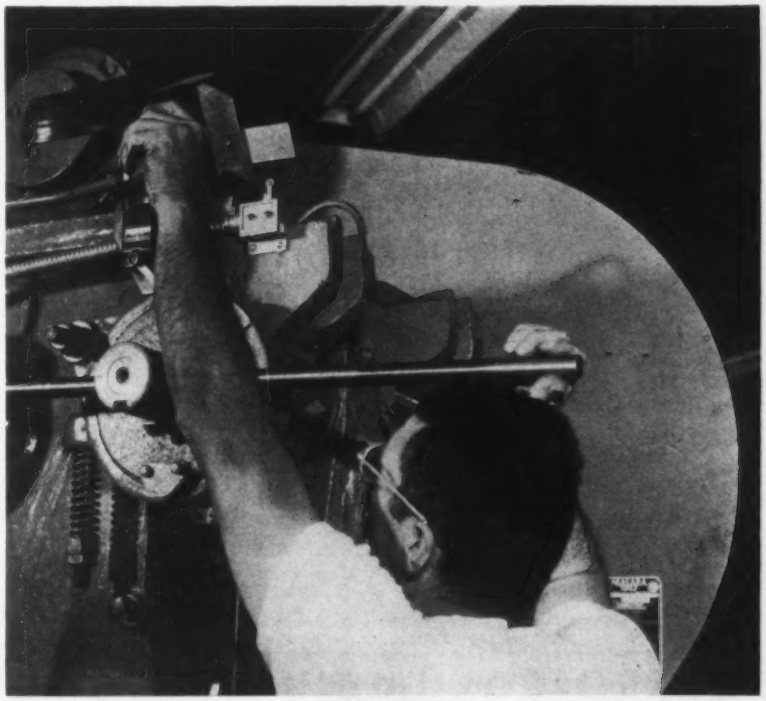
Also, there may be wide variations in conditions, by size and types of plants. The National Safety Council cites one problem: So far, guards on power transmission parts of machines are optional equipment. Virtually all machine builders offer these guards, and plant engineers display vital interest in them. But, many firms insist on buying machines stripped down—without guards.

Efforts Aren't Wasted — Many companies, of course, are really safety conscious. Some time ago the American Society of Tool & Manufacturing Engineers devoted a large part of a national program to human engineering and development of safety in modern automatic production equipment. It pointed out that 1959 showed little improvement over 1958 in the industrial accident rate.

What can individual companies do to better their safety record? Many larger firms have safety directors and regular programs. From available figures, it appears that these efforts pay off; these plants are safer.

Ingenuity at Work—Part of the effort is to eliminate hazards as they crop up. Recently, as an example, Burroughs Corp., Detroit, was surprised by a "freak" accident that apparently couldn't happen. When a setup man attempted to remove dies from a punch press, the press started up. The divisional safety man went into action. With help of tool room employes the plant developed an ingenious safety device—a micro-switch and a cover for the press ram's cam.

To set up or tear down a job, the cover must now be lifted back before a pry bar can be inserted. This makes the machine inoperative. And to allow the press to function, the bar must be removed so the cover drops back into position.



ACCIDENT PROOF: A precision switch, strap steel and lamp shade eliminate a potential hazard in punch presses at Burroughs Corp.'s Military Electronic Computer Div. To insert pry bar in ram, setup man must lift a cover which makes the press inoperative.

INDUSTRIAL BRIEFS

Something New—After 50 years as a metal fabricator, the Risdon Mfg. Co. has added a Plastics Div. to its operation at Naugatuck, Conn. Established to serve its own need for plastic components used in conjunction with metal parts, the division also will produce for other companies.

Big Gate—A new high in attendance was reached when 600 persons registered at the Fifth Annual Appalachian Underground Corrosion Short Course. It was held June 1-3 at the West Virginia University, Morgantown, W. Va. Students from Canada, Cuba and Mexico were in attendance at this course which covers all phases of underground corrosion.

In Office—The Governing Council of the International Institute of Welding elected F. L. Plummer International vice president of the Institute. He assumed office at the annual assembly in Liege, Belgium. Mr. Plummer is national secretary of the American Welding Society and chairman of the American Council.

New Replacement—The Torrington Co. is building a new West German plant for the production of needles and bearings. Located on a 13-acre site at Wurselen, the plant will replace the company's present facilities at Aachen. Completion is scheduled for this fall.

New Parent — Wisconsin Centrifugal Foundry, Inc., Waukesha, Wis., has acquired the Wisconsin Stainless Foundry & Machine Corp. also of Waukesha. The new facility will be operated as the Stainless Div. of the parent company.

Aimed Research—Fundamental research aimed at developing a metal-wear science is under way at Armour Research Foundation, Chicago. ARF's scientific team is made up of researchers in metals, mechanics, physics, and chemistry. The three-year, $300,000 program is to develop an understanding of the complexities surrounding wear-friction phenomena.

Space Research — A new research center for space problems at Thompson Ramo Wooldridge, Cleveland, was dedicated this month. Colwell Engineering Center is named after A. T. Colwell, vice president, engineering, research and development. It is the first phase of a $5 million facility.

New Field — Northrop Corp., Beverly Hills, Calif., has purchased all of the stock of Acme Metal Molding Co. Acquisition moves Northrop into the commercial metal products field. The transaction included two Acme marketing and distribution companies — Acme Metal Molding Co., Ltd., of Canada and the Acme Metal Molding Co. of Texas.

All Done — The Centrifugally Cast Products Div., The Shenango Furnace Co., Dover, O., completed its $5 million improvement and expansion program. Equipment additions and relocations in the foundry and machine shop will improve ferrous and nonferrous centrifugal castings. Other improvements include enlarged research and testing facilities, general office modernization and a new shipping building.

New Job—D. Wilmot has been named asst. director for Mobilization Planning, Aluminum and Magnesium Div., Business and Defense Services Administration, U. S. Dept. of Commerce. Mr. Wilmot retired several months ago as vice president, Aluminum Co. of America, in charge of product sales and distribution.

Higher Ups — The Ohio Locomotive Crane Co., Bucyrus, O., has acquired the entire locomotive crane business of The Wellman Engineering Co., Cleveland. Effective June 15, the transaction involved both the Wellman diesel electric locomotive crane and former Browning mechanical locomotive crane. New distribution and sales plans are still under study.

In Agreement — Allis-Chalmers Mfg. Co. and Bell & Howell have an agreement on joint ownership of an electronic systems engineering firm in California. AC would acquire 50 pct of the common stock of Consolidated Systems Corp., Monrovia, Calif., a wholly-owned subsidiary of Bell & Howell's Consolidated Electrodynamics Corp. Agreement has been reached and the transaction will be completed this month.

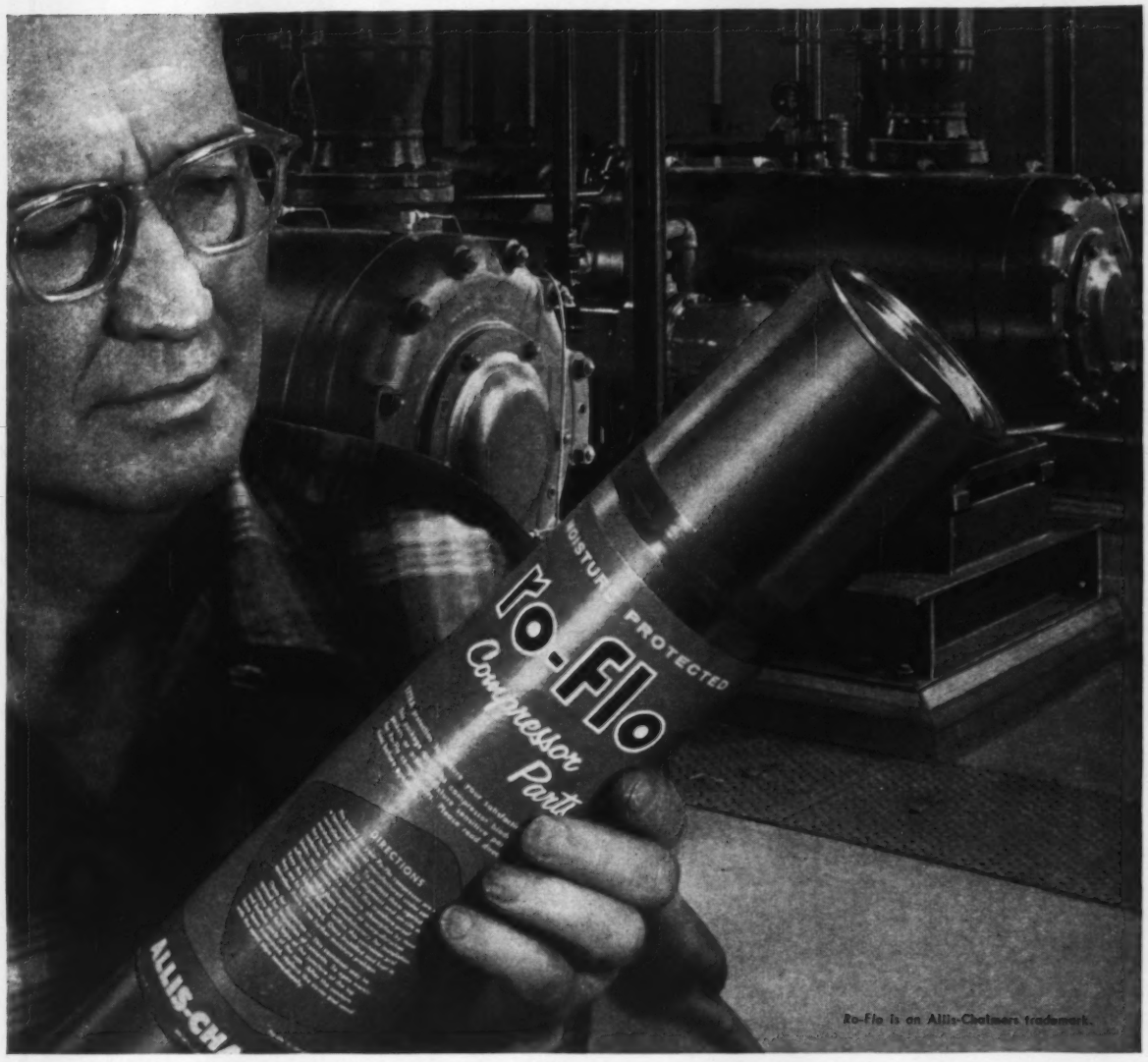
Going Up—The Ohio Seamless Tube Div., Copperweld Steel Co., has let a contract for erection of a factory structure to Jennings & Churella, Inc., New London, O. It is to house the company's new welded tube mill at Shelby, O. Completion date for the facility is October 31. It is part of the division's $3 million expansion program.

More Coming — Clark Equipment Co.'s Industrial Truck Div. is expanding its facilities in Battle Creek, Mich. New space totaling 14,000 sq ft is being added to the building in which fork truck attachments and special devices are manufactured. The main assembly building will have 21,600 sq ft added.

FERRO-COLUMBIUM
Consult Us For Your Requirements
TRANSITION METALS & CHEMICALS, INC.
WALLKILL NEW YORK

GOSS and DE LEEUW
MULTIPLE SPINDLE
CHUCKING MACHINES
Tool Rotating
GOSS & DE LEEUW MACHINE CO., KENSINGTON, CONN.

ALLIS-CHALMERS



Imagine! A package this small

contains the spare parts for your Ro-Flo compressor

A spare parts kit you can hold in your hand — dramatic evidence of the continuous, trouble-free performance that is yours with a *Ro-Flo* compressor.

You need fewer spare parts because there are fewer moving parts to wear out. No pistons, no valves, no connecting rods. Besides the bearings and seals, which all units have, only the rotor blades are exposed to normal wear, and rotary design compensates for it — automatically, by centrifugal force. Average blade life is two to three years, and when finally worn, blades can be replaced in one simple operation.

Smooth rotary motion of the *Ro-Flo* compressor eliminates the vibration and pounding shock of reciprocating units — and the necessity for expensive, heavy foundations. A slab is enough. Smaller units can be mounted directly to the floor.

Two-stage *Ro-Flo* compressors are built in twelve sizes to handle from 250 to 1800 cfm at pressures from 60 to 125 psig. Single-stage units up to 50 psig, from 40 to 3000 cfm. *Ask your A-C representative for descriptive literature, or write* **Allis-Chalmers,** *Industrial Equipment Division, Milwaukee 1, Wisconsin.* A-1270

Ohio Rolls

SHAPING METAL FOR ALL INDUSTRY

Ohio Iron and Steel Rolls

- FORGED AND HARDENED STEEL ROLLS
- Carbon Steel Rolls
- Ohioloy Rolls
- Ohioloy "K" Rolls
- Flintuff Rolls
- Double-Pour Rolls
- Chilled Iron Rolls
- Denso Iron Rolls
- Nickel Grain Rolls
- Special Iron Rolls
- Nioloy Rolls

OR36

THE OHIO STEEL FOUNDRY CO., LIMA, OHIO

PLANTS AT LIMA AND SPRINGFIELD, OHIO... *Virtually at the center of the steel industry*

P. O. Geier, Jr., elected vice president and appointed asst. general manager, The Cincinnati Milling Machine Co.

Westinghouse Air Brake Co.—**J. E. Stark,** appointed asst. vice president, industrial relations.

Stran-Steel Corp., Div. of National Steel Corp.—**J. G. Skaaren,** appointed asst. to the president.

American Can Co.—**W. C. Stolk,** elected chairman and chief executive officer; **R. J. Sund,** elected president.

The Singleton Co.—**T. W. Gulley, Jr.,** elected president.

ACO Div., Alter Co.—**I. E. Beaman,** elected vice president.

The Black-Clawson Co.—**C. C. Landegger,** appointed executive vice president.

Yale & Towne Mfg. Co., Yale Lock and Hardware Div.—**J. J. Gell,** appointed asst. general manager, manufacturing.

Hyster Co., International Div.—**Hollis Conner,** appointed sales manager, headquartered at Peoria, Ill.

B-G-R Div., Associated Spring Corp.—**H. J. Toll,** appointed personnel manager.

Baltimore Div., Revere Copper & Brass Inc.—**H. W. L. Burhenn,** appointed treasurer.

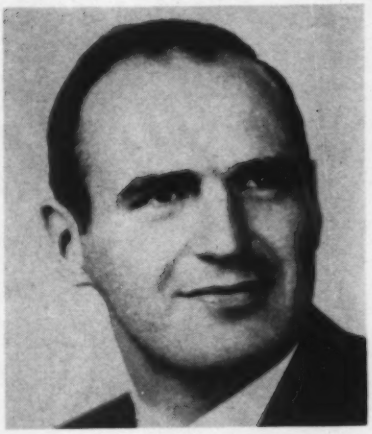
National Carbon Co.—**R. M. Bushong,** named director, Advanced Materials Project.

Thayer Scale Corp.—**J. S. Blackwell,** appointed general sales manager.

Joseph T. Ryerson & Son, Inc.—**R. E. Clark,** appointed manager, aluminum product sales, Detroit plant.

The Lincoln Electric Co.—**J. L. Munson,** named manager, administrative services.

Michigan Limestone, Div. of U. S. Steel Corp.—**R. L. Landis,** appointed asst. to the manager, Northern district.



R. P. Jensen, appointed manager, industrial foil, laminations and containers, Kaiser Aluminum & Chemical Corp.

McDowell Co., Inc.—**T. E. Ban,** elected vice president, research.

Coffing Hoist Div., Duff-Norton Co.—**F. H. Heyden,** appointed hoist products engineer.

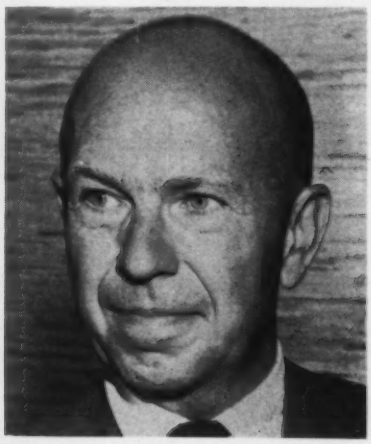
Jones & Laughlin Steel Corp., Hot Rolled Bar & Shape Products Div.—**D. W. Alexy,** appointed asst. to manager.

Rubicon Div., Minneapolis-Honeywell Regulator Co.—**C. S. Mar-**

(Continued on P. 135)

J. L. Schumann, elected president and a director, Buell Engineering Co., Inc.

P. N. Stanton, named vice president, marketing, Pratt & Whitney Co., Inc., W. Hartford, Conn.



R. S. Kahn, named vice president, alloys and nonferrous metals, Luria Bros. & Co.

ANOTHER NORTON PRODUCT

the New VIZI-DISC

lets you see your work while you grind. It cuts cooler and gives you pin-point accuracy

The unique shape of the METALITE VIZI-DISC gives it "see-through" like a fan blade or an airplane propeller. The operator can see right through the work area of the disc. Obviously, the intermittent action means cooler operation. Get a free demonstration of VIZI-DISC. Just call your Behr-Manning representative or write Dept. IA-6, BEHR-MANNING CO., TROY, N. Y., A DIVISION OF NORTON COMPANY.

BEAR BRAND Coated Abrasives

Here is the VIZI-DISC mounted on a portable electric grinder, ready to run. Note the unique shape with parallel sides.

As the grinder starts, note the spinning pattern, similar to an airplane propeller or the blade of an electric fan.

Full rpm. With the VIZI-DISC there is no blind spot. You see your work while you work, as the grinder gets revved up.

(Continued from P. 133)

shall, appointed manufacturing superintendent.

Oakite Products, Inc.—**D. B. Lamb,** appointed Detroit division manager.

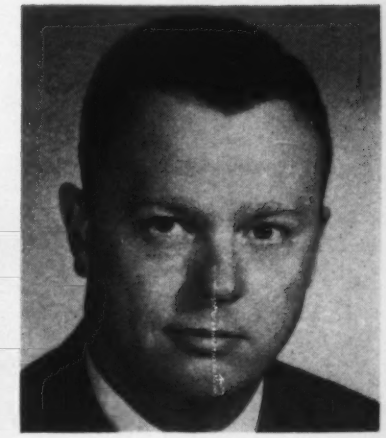
W. H. Hauschildt, appointed chief production engineer, aluminum operations, Foundry Dept., Bay City, Mich., The Dow Metal Products Co., Div. of The Dow Chemical Co.

Aluminum Co. of America, Cleveland Sales Development Div.—**W. C. Keith,** named acting manager.

Pennsalt Chemicals Corp.—**J. M. French,** named manager, development, Corrosion Engineering Products Dept.

Stromberg-Carlson's Electronics Div.—**H. A. Bond,** appointed manager, reconnaisance systems.

Roland Hecker, named chief engineer, Burg Tool Manufacturing Co., Inc., Gardena, Calif.



J. F. Delany, named manager, can sales, Kaiser Aluminum & Chemical Sales, Inc.

Climax Molybdenum Co.—**Takashi Chihara,** appointed manager, technical development in Japan.

Chicago Tramrail Corp.—**R. T. Gustafson,** appointed general sales manager.

The Producto Machine Co., Machine Tool Div.—**D. E. Glass,** appointed sales manager.

Nathaniel Pope, appointed sales manager, Pacific Coast Div., Revere Copper & Brass Inc.

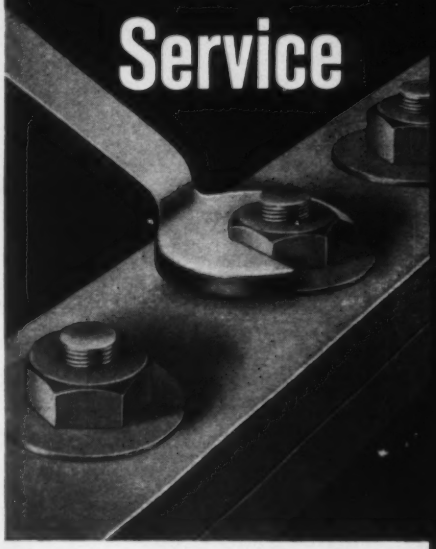
OBITUARIES

M. M. Kindig, 83, president, The Burger Iron Co., Akron, O.

E. B. Thomas, 68, formerly of the New York public relations staff, U. S. Steel Corp.

News for
HEAVY INDUSTRY...

Tailored Customer Service



Whether you're building heavy machinery, steel mills, railroad cars, construction equipment or other capital equipment . . . we can save you time, money and production problems with *tailored customer service:*

- **tailored** to industry standards or your own specifications . . . impact-form'd heavy duty nuts and bolts
- **tailored** product verification . . . every heat verified in our own laboratories
- **tailored** design recommendations . . . to your application requirements
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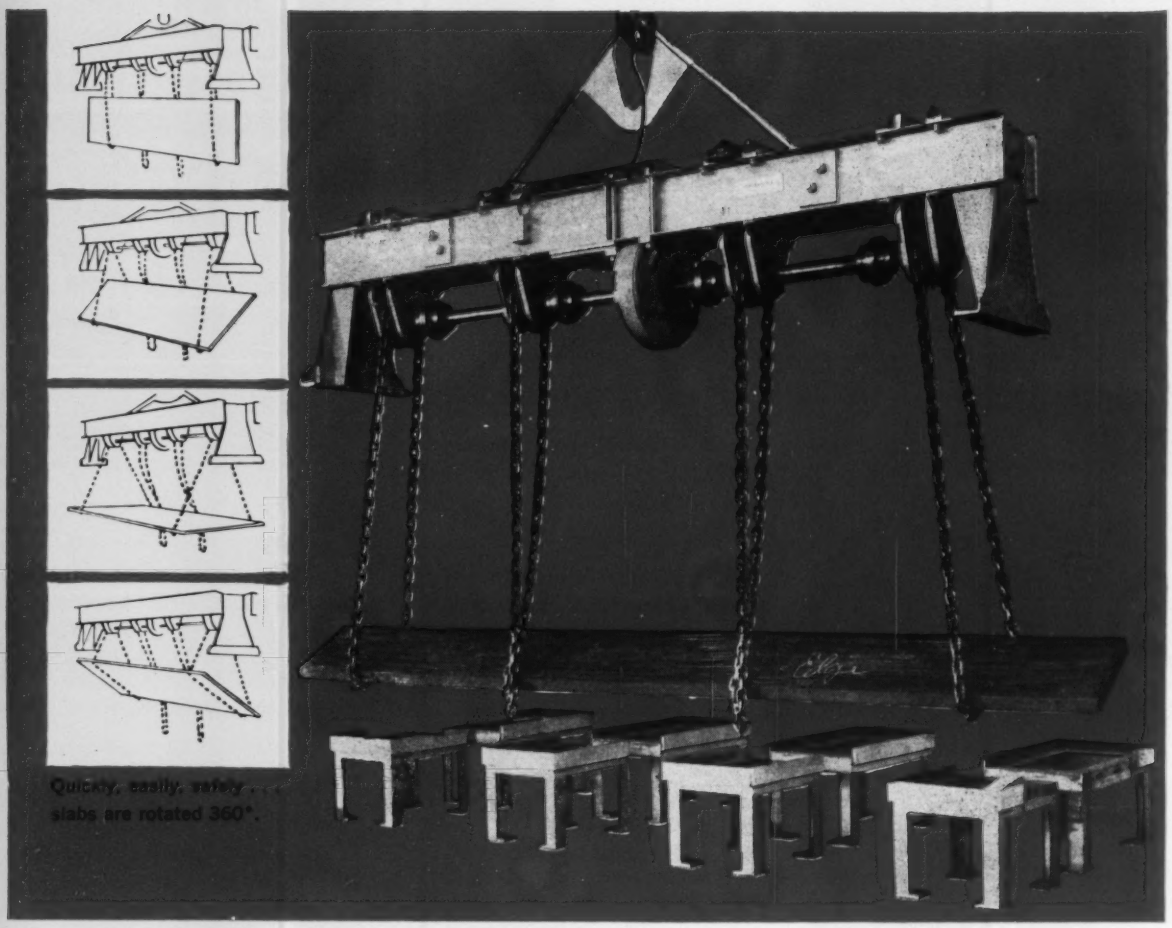

Quickly, easily, safely . . . slabs are rotated 360°.

at Empire-Reeves Steel Corporation . . . slabs are raised, lowered, turned over with Heppenstall Slab Rotator

Surface grinding of stainless steel slabs has been made easier and faster by this Heppenstall Slab Rotator. Raising, lowering and turning of the slabs is controlled entirely by the crane operator from his cab. Rated at 25,000 pounds capacity, the Rotator handles slabs up to 50-inches wide.

For machine grinding imperfections, the slab is lowered until it rests flat on a series of tables. Then the chains are removed, and the Rotator moved away. After one side is completed, the Rotator is used to turn the other side up. To grind the edges, the slab is turned on edge and lowered between the two rows of tables. When not in use, the Rotator rests on the "legs" built on each end for that purpose.

Slabs less than 14-feet long are handled by the two center chains. The two outer chains are used to handle longer slabs.

After grinding, the slab is carried to the strip mill, lowered on to a conveyor and the chains removed. The Rotator then picks up another slab in the slab mill.

If you'd like more information about this special slab-handling Rotator . . . other Heppenstall slab-handling devices . . . or any other kind of material handling equipment . . . just let us know. If you'd like a quotation, just phone or mail us the details of the job. Heppenstall Company, Materials Handling Division, New Brighton, Pa.

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Metallic Coatings

■ Vital to the sales appeal of their metal products, most fabricators agree, is the coating over the base metal.

When the coating is metallic, it may be applied either before or after fabrication. However, working with metallic coatings applied before—or precoated—represents a trend that is shaping up quite rapidly in the metalworking industry.

The reasons for coating one metal over another are many and varied. They run the gamut from getting improved corrosion and wear resistance to better appearance.

Since the only way to meet today's competition is to improve your cost picture, it might be well to consider the use of precoated metals.

In many cases, alert management has found that precoated metals lead to lower production costs—without compromising the improved appearance and quality in the finished product.

Whether or not you're already using precoated metals, the large influx of new tailor-made materials on the market deserves appraisal. It may change your concept of production.

How to Get More For Your Metalworking Dollar

No. 3 of a Series

Metallic coatings is the subject for this special feature, the third in The Iron Age's 1960 Metalworking Dollar Series. Other features include:

1. March 3: Cutting Fluids
2. April 14: Numerical Controls
4. August: Special Fasteners
5. October: High-Strength Metals
6. December: Special Machining Methods

American Nickeloid Co.

BLANKS PLATED STEEL: Most precoated metals are easily formed. Sheet of chrome-plated steel to be used for breadbox is easily blanked with punch-out perforations. No post-plating after fabrication is needed.

Why Precoated Metals Pay Off

Precoated metals are on the move. Greater quantities are being used; variety of applications is increasing.

Why are fabricators switching to these metals? How can they fit into your production line?

By C. L. Kobrin,
Metallurgical Editor

■ Manufacturers and builders are finding precoated metals to be the answer to a problem that has plagued the metalworking industry for many years.

The problem? To improve the appearance and quality of their finished products while, at the same time, lowering production costs.

Poses a Challenge—This problem is especially acute where the job calls for finished metals. Finishing these metals at the end of the production line poses a challenge to quality output and lower costs.

Here's where precoated metals come into play. As the term implies, these materials can be bought to specification and ready for forming—with the coating already applied.

All that's required of the manufacturer is fabrication and assembly. Once these operations are finished, the product is ready for packing and shipping.

Coats in Several Ways — The term "precoated metals" needs some qualification. For the purpose of this discussion, "precoated metals" pertains to metals coated to metals either by electroplating, hot-dipping, cladding or diffusion processes. A previous IRON AGE special report to management (October 22, 1959) covered coated metals with non-metallic finishes.

An endless variety of coated-metal combinations are available—depending on the use to which the metal is put. You can buy them in most wrought forms whether they be strip, sheet, plate, wire or tubing. A complete assortment of gages, widths, lengths, and coating thicknesses can be had.

Reasons for coating one metal over another are many and varied.

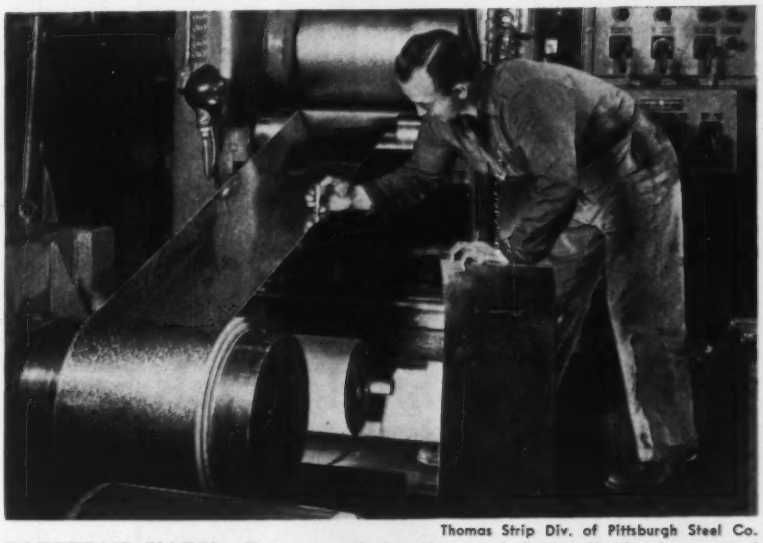
They run the gamut from better corrosion resistance to improved appearance and physical properties. Consider these examples:

Platings Are Versatile — Nickel plated steel resists oxidation at high temperatures. Thus, it has many functional applications for radio, telephone, and other electronic equipment. Copper-plated zinc is used for making moldings, trim, and decorative work. Tin and cadmium are electroplated onto aluminum for reducing friction on bearing surfaces. Tin-coated steel enjoys wide use for food and non-food container applications.

Steel, hot dipped in zinc or aluminum—the familiar galvanized or aluminized metal — are popular choices for the construction industries. These low-cost materials are strong and corrosion resistant.

Mufflers, lasting "for the life of the car," can be made from steel into which chromium has been diffused. Calorized steel (aluminum diffused into steel) tubing does a very effective job in oil cracking stills and gas polymerization units. It resists exterior oxidation and interior sulfur corrosion at high temperatures.

Stainless-clad steel is helping to house the core of the reactor for the nation's first industrial power sta-

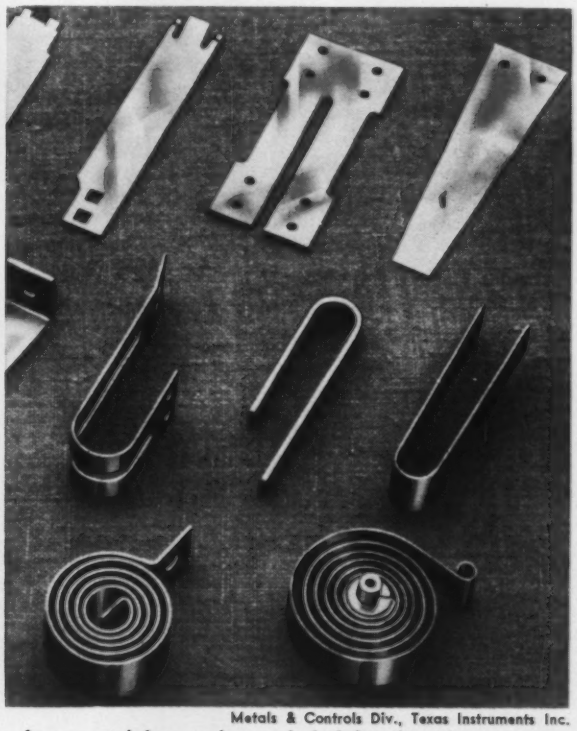


Thomas Strip Div. of Pittsburgh Steel Co.

PATTERNS VARY: Pattern rolled strip steel is available in several embossed designs. Or new designs can be created for specific needs.

Precoated-Metal Use Ranges From the Big to the Small

Lukens Steel Co.



Metals & Controls Div., Texas Instruments Inc.

SIZE IS NO PROBLEM: Precoated metal is a popular choice despite size of final product. Applications range from a stainless and monel-clad fractionating tower to small parts made from clad thermostat metal.

tion at Shippingport, Pa. Gold-clad nickel is used for jewelry and chemical processing equipment. And many other clad metal combinations are used for electrical contacts and thermostats.

Gain Other Rewards—When you buy precoated metals, you also get a number of other rewards—some of them unforeseen—in addition to improved properties.

Ready-to-fabricate metals streamline your manufacturing processes to two essentials—fabrication and assembly.

Initial preparation, intermediate cleaning and buffing, and final coating may all be eliminated. Your profit-producing production starts at least three steps ahead.

Where Precoated Metals Serve

APPLIANCES
- Bake pans
- Food canisters
- Furniture parts
- Kitchen cabinets
- Ovens
- Radio and TV cabinets
- Refrigerators
- Toasters, hot plates and fryers
- Vending machines
- Vents and hoods
- Washers and dryers

CONSTRUCTION
- Barbed wire
- Ceiling suspension systems
- Chain
- Doors
- Downspouts and gutters
- Expanded metal lath
- Guy wire
- Roofing
- Roofing shingles
- Scaffolding
- Special fabricated nails
- Venetian blind hardware

TRANSPORTATION
- Air filters
- Automotive accessories
- Boat hulls
- Boxcar roof panels
- Mobile homes
- Mufflers
- Radiator shells
- Tank cars
- Trailer body liners
- Trim and molding

INDUSTRIAL EQUIPMENT
- Chemical processing
- Coal chutes and bunkers
- Commercial laundering
- Doughnut machines
- Heat exchangers
- Heat treat furnaces
- Hospital sterilizers
- Nuclear reactors
- Soap manufacture
- Space heaters
- Telephone wire
- Tools
- Ventilating ducts
- Water heaters

MISCELLANEOUS
- Advertising displays
- Badges and buttons
- Barrels
- Clothing accessories
- Containers and receptacles
- Cooking utensils
- Decorator items
- Desk supplies
- Electrical contacts and switches
- Fire extinguishers
- Fish lures
- Garbage cans
- Housewares items
- Jewelry
- Lighting fixtures
- Outlet boxes
- Switchgear
- Thermostats
- Tool boxes
- Toys
- Transistors
- Trunk hardware

Boost Plant Capacity—In many cases processing cycles have been cut from eight to ten steps down to two or three. Saved are the costs of handling, preparation and cleaning, operating coating-equipment, and floor space. With this saved time and space, the potential of your plant's capacity increases.

Also, you get the technological benefit of coating experts who are constantly in pace with the latest developments in the coatings field. And the most advanced equipment and controls assure uniformity of coatings.

Many coatings act as a die lubricant. They increase die life, reduce wear and cut tooling costs—thus boosting production per die.

When converted into parts with punchouts or depressed areas, the thickness of the coating remains constant. There is no danger of getting insufficient coating in hard-to-reach areas on the finished part.

Protects During Storage—Here's another point to consider. The coating protects the metal from rusting or corroding while it is in storage awaiting its need on the production line. Thus, inventory losses are cut and production delays are reduced.

A variety of precoated metal patterns and finishes are available to add glamor to modern design. You can choose from striped, crimped, or embossed stock.

One company states that any design that can be drawn on paper can be rolled into the coated metal. As for finishes, they range from a soft luster to a mirror-bright surface.

Any Other Aspects? — What about fabricability? Most precoated metals form easily. The coating can stand as much working as the base metal without cracking, peeling, or flaking. They run smoothly at top speed through progressive dies and intricate forming rolls. Moreover, they can be easily welded, brazed, or soldered.

Large Variety Eases Selection

Selecting a precoated metal is based on a number of factors including design, environment, and fabricability.

But out of the large variety of available precoated metals, there's bound to be one to fill your needs.

■ How is the designer or fabricator of a metal product to know which of the many available precoated metals will best suit his needs? What about the builder? Which material should he use?

Special attention should be given to these important factors: Select surface finish and pattern with care. Consider visual design as related to sales appeal. Take care that your choice will assure maximum economy—for both fabrication and in-service performance.

Consider the Job—The intended or expected life of the metal product must be taken into account. For example, will the precoated metal be subjected to heat, wear, abrasion, corrosion, or any other unusual conditions? How well will these special materials take forming? Are there any joining problems?

Selection of a precoated metal is often based on the manner in which the coating is applied. The method of coating determines the thickness of the coat.

Electroplated coatings, in general, are thinner than hot dip coatings. But they are uniform, nonporous coats and are capable of taking a high polish.

Thus, they are quite suitable for interior decorative purposes. Certain electroplated metals, though, have mild chemical and atmospheric resistance and can be used accordingly.

Features Heavy Coat—For constant exposure to the outdoors—in such applications as roofings and sidings, a hot dipped metal such as galvanized or aluminized steel is a preferred choice. The heavier coat affords that much more corrosion resistance.

A potential user might ask, "Since hot dipped galvanized sheets have heavier coatings and greater resistance to corrosion than the electrolytic product, why should I use electrolytic zinc-coated sheets at all?"

One reason is that the electrolytic product was developed primarily for painting and achieves an excellent paint bond. Another is that it can be easily spot welded, whereas the heavy zinc coating may result in poor welds, fumes and fouling of welding tips.

Metal Lubricant—The need for high joinability and formability often governs the selection of a precoated metal. Lead and tin have excellent solderability and act as a lubricant during various forming operations such as drawing.

Thus, they are ideal for certain tubing, bearings and electrical parts that require soldering. Why not use these metals by themselves? They have little structural strength and hence, are coated onto steel.

When the environment is especially severe, and the coating must be extra heavy, clad metals are often chosen. With these materials, the coating is normally 5-20 pct of the total thickness. Sometimes, it is much more.

For Design Freedom — Clad metals are particularly interesting since they can be tailor-made to fit most industrial needs and to achieve design freedom. The best qualities of several metals can be combined into one.

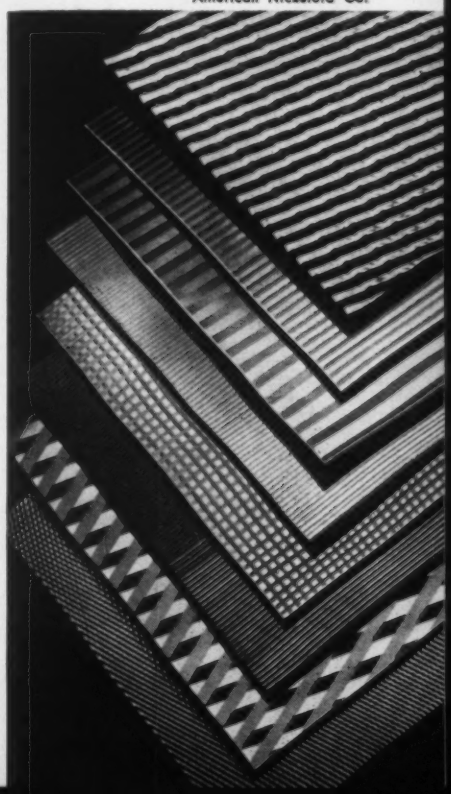
Silver, clad to copper, gives both corrosion resistance and thermal conductivity. It is used for high temperature coils, high-frequency conductors, and radar cable braiding.

Silver is also used for electrical contacts because of its good arc resistance. For one application, it is clad to nickel to get added wear resistance. For another job, it is clad to beryllium-copper because the base material must have good spring properties.

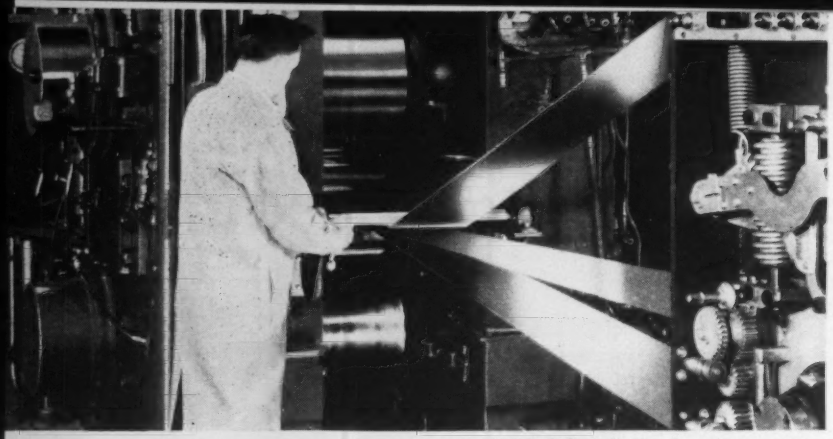
Other examples are: nickel-clad silver to combine electrical conductivity with corrosion resistance; aluminum-clad copper to make a less bulky magnet wire than a normal insulated copper material.

Same Rules Apply—Heavy steel

American Nickeloid Co.



SALES APPEAL: Electroplated metals come in a variety of patterns to add glamor to the product.



Metals & Controls Div., Texas Instruments Inc.

CLADS METAL: Process bonds metal in continuous strip by rolling. Result: a tailor-made material combining best features of several metals.

plates with a large variety of cladding and backing materials are also available. For example, you can select cladding materials from several types of stainless steel, nickel, Monel, Inconel, and copper. Even titanium-clad steel is being developed.

The backing steel is ordinarily low-carbon steel but may be of low-alloy steel so long as it conforms to standard plate specifications.

If strength at high temperature is needed, A-204 and A-387 steels are preferred for backing materials. The latter also resists graphitization and high-temperature hydrogen attack. For low-temperature service, the nickel-containing steels, such as A-203 are most suitable.

Includes Sample List—Of major concern to the potential user of precoated metals is the variety of materials available. Is there an adequate assortment of wrought forms?

To answer these questions, the table on the next page has been prepared. It includes a representative list of the endless number of precoated metal combinations that can be purchased.

Meet Most Needs—Note that there's a precoated metal for most fabrication needs. And these metals pose no major problems in forming and joining.

This means that they fit smoothly into established production operations. No special machines or specially-trained workmen are necessary.

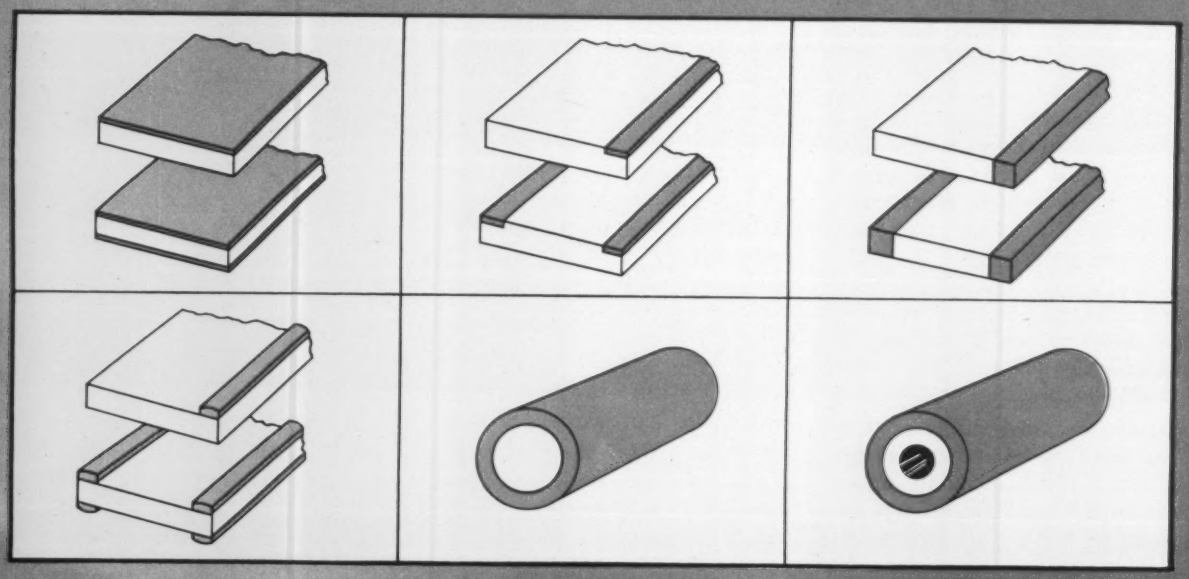
Not included in the table are the complete ranges of gages, widths, lengths, and coating thicknesses available. For example, you can buy strip—in coils for added production efficiency—from ¼ to 48 in. wide, or sheets in sizes up to 4 x 16 ft. Tubing can be round, half round, square, or rectangular.

Patterns or Textures — Suppose you want special patterns or textures. The photograph shows some typical striped, crimped, or embossed patterns that can be rolled into precoated metal. As for finishes, they range from subdued to mirror bright.

There are a number of types of cladding—depending on the nature of the product to be fabricated. Some of the best known types are overlay, inlay, edgelay, top-lay, wire and tubing.

Whatever your needs, it's fairly certain that a precoated metal supplier can fill the bill.

These Claddings Show Process Versatility



Precoated-Metal Types Point Up Diversity

Coating	Base	Products	Features	Formability*	Solderability or brazeability	Weldability	Typical Uses
CLAD							
Aluminum	Steel	Strip, sheet, tubing, wire	Corrosion and heat resistant; high reflectivity	√	√	√	Auto gaskets; bake pans; electron tubes
Copper	Aluminum	Strip, sheet, tubing, wire	High electrical conductivity and heat dissipation; easy fabricability; low cost	√	√		Bus bars, gift wares, electrical terminals, heat-transfer plates
Gold	Nickel	Strip, sheet, tubing, wire	chemical resistance; low-cost base	√	√	√	Chemical process equipment, wrist bands, watch cases
Phosphor Bronze	Copper	Strip	Excellent spring properties; high electrical conductivity; corrosion resistant	√	√		Current carrying springs, flat spring blades for switches
Stainless Steel, Monel or Inconel	Steel	Sheet, plate, heads	Corrosion and oxidation resistant; long life; low cost; easily worked	√		√	Coal chutes and bunkers, salt pots, refinery vessels
Stainless Steel	Copper	Strip, sheet, tubing, wire	Corrosion resistant; high heat transfer, strong	√	√	√	Cooking utensils, heat exchangers, rectifiers, vacuum tubes
Platinum	Copper	Strip, sheet, tubing, wire	Chemical resistant; electrical contact properties; low-cost base material	√	√		Chemical process equipment, electrical contacts, jewelry
ELECTROPLATED							
Brass, Copper, or Gold	Steel	Strip, sheet, round edge flat wire	Rigid; smooth; low-cost substitute for more expensive metal	√	√	√	Lamp trim, cymbals, wall clocks, display stands, reflectors
	Zinc	Strip, sheet, round edge flat wire	Rust-proof; flexible; low-cost substitute for more expensive metal		√		Trim and moldings, badges and buttons, jewelry
Nickel or Chromium	Aluminum	Strip, sheet	Lightweight; durable; corrosion resistant		√		Lighting fixtures, boiler-pan grips, stove parts
	Brass	Strip, sheet, round edge flat wire	Easily worked, durable, rust-proof	√	√		Metallic mirrors, fish lures, fireplace hardware
	Copper	Strip, sheet, wire	Corrosion resistant; pliable; free from season cracking	√	√		Electrical devices, signs, reflectors
	Steel	Strip, sheet, pipe, round edge flat wire, heads	Rigid; smooth; heat resistant; good ductility	√	√	√	Appliances, toys, housewares, process equipment
	Zinc	Strip, sheet, round edge flat wire	Low cost; flexible; rust-proof		√		Trim and moldings, auto accessories, display signs
Zinc	Steel	Strip, sheet, wire	Corrosion resistant, easy fabricability, long life, strong	√	√	√	Acoustical ceilings, dry-wall moldings, garage-door panels
HOT-DIPPED							
Aluminum	Steel	Strip, sheet, tubing, wire	Heat and corrosion resistant; high-heat reflectivity; long life	√		√	Auto mufflers, and tailpipes waffle irons, industrial ovens
Tin	Steel	Sheet, strip	Non-corrosive; non-toxic	√	√		Containers, toys, utensils
Zinc	Steel	Strip, sheet, tubing, wire	Corrosion resistant; easily worked; durable; low cost	√	√	√	Roofing and siding, heating ducts, metal lath
Lead	Steel	Strip, sheet	Corrosion resistant; easily worked; acts as lubricant during forming	√	√		Battery boxes, pole-line hardware
Lead-Zinc (Terne)	Steel	Sheet	Corrosion resistant; very ductile; low cost	√	√		Automobile gas tanks, oil cans
IMPREGNATED							
Aluminum	Steel	Tubing	Oxidation and sulphur corrosion resistant			√	Oil cracking stills, heat-treat equipment
Chromium	Steel	Sheet, plate	Corrosion, heat, and wear resistant	√		√	Auto mufflers, heat exchangers canning equipment

* A check rating (√) means that the metal's overall formability is "good" or better—as rated by the producer.

American Nickeloid Co.

GOOD PRACTICE: Plated metals are easily formed without marring of surface. But keep tools nick-free.

Can Standard Methods Be Used To Form Precoated Metals?

How do precoated metals take to the various forming operations? Are they in danger of losing or marring their finished surface.

The answer: Standard techniques will do. And here's some tips for easing the job.

▪ It is not necessary to pamper precoated metals during forming operations. These versatile materials can take almost as much punishment as the base metal alone.

This means that there are no hidden costs when forming precoated metals. All it takes is standard shop practice. Usually no more than ordinary care is needed to protect the finish during forming.

Some Forming Tips—And if you want even greater ease of fabrication, there are these suggestions for forming.

For example, when forming electroplated metals with press equipment, bronze dies are effective in minimizing metal pick-up and damage to surface.

Plated metal has more springback than raw metal; so make allowances when aligning dies. Keep radius of angle as large as possible to minimize distortion.

Some other tips: Ferrous metals should usually be press-formed at slower speeds than non-ferrous metals. Tools should be kept free of sharp nicks and rough edges. As for lubrication, quite often it is not necessary—thus cutting out a cleaning step.

Takes a Lubricant — Heavy nickel-plated steel shows excellent working qualities, especially in press forming and press brake operations. But at the beginning of each forming step, a lubricant—preferably water soluble—helps. It should

have little or no sulphur or lead content.

A little extra care is required when blanking. Lubrication consists of lightly swabbing the punch with oil, and the press idled a few strokes to lubricate the die.

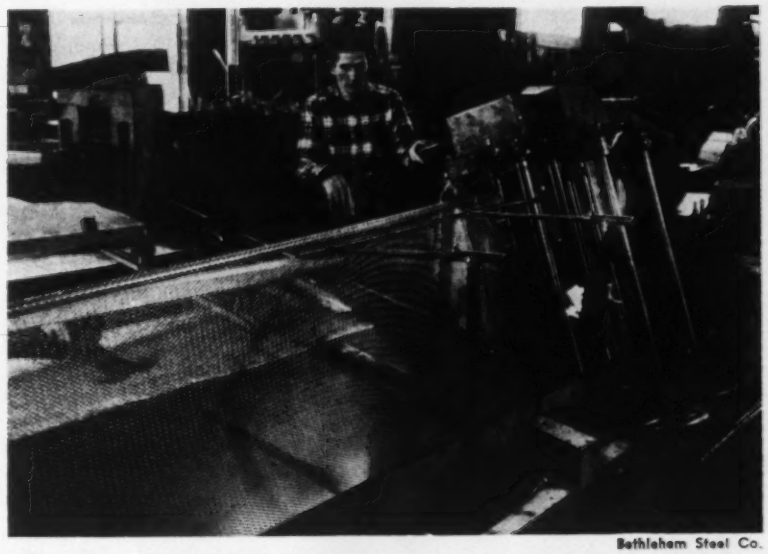
Recommended is a SAE 20 oil —three parts to 1 part of kerosene. It is particularly useful when blanking zinc-base metal. If you use emulsified oils, good technique calls for cleaning and drying the parts right after blanking.

Die Must Be Sharp—Chromium plating of the blanking die does not increase die life as it does with forming dies. Use the best grade of steel when blanking—and sharpen when necessary.

In regard to punch and die clearance, follow good shop practice. The better the fit, the less burrs will be developed.

How about drawing of plated metals? What's the best way to handle this grain-distorting operation?

When using a mechanical motion press, plated steels are usually formed at speeds slower than brass, copper, or zinc. A hydraulic press is preferred for deep drawing of embossed parts. It cuts down on metal fracture.



Bethlehem Steel Co.

BRUTAL TREATMENT: Fabrication of metal lath by first slitting, then expanding zinc-coated sheet is brutal test. Yet, zinc coating holds up.

Oil Reduces Breakage—Lubrication is important—especially when the ratio of draw to diameter is large. Metal should get a fairly uniform coating of oil, otherwise undue breakage may result.

Soluble oils are satisfactory if the parts are cleaned and dried shortly after forming. Reason: the water in these oils may cause staining and corrosion. If desired, heavier viscosity oil can be used. Small parts can then be basket or barrel cleaned and dried.

Bending takes only normal shop practice. Tools and machines should be inspected to remove nicks and rough edges. To prevent undue distortion at bent edges, try using a larger radius.

For severe fabricating jobs, plated metals can be ordered with a protective coating. It can be a strippable plastic film, or a pres-

How To Machine Flame-Cut Clad Steels

Plate Gage, in.	Cutting Speed, ipm	Oxygen Cutting Pressure, lb min.–max.	Airco Tip Size	Oxweld Tip Size	Approx. Cutting Orifice Diam., in.
3/16	22–25	5– 7	1	4	0.0465
1/4	19–21	6– 8	2	4	0.055
3/8	16–18	7–10	3	6	0.0635
1/2	15–17	7–12	4	6	0.073
5/8	14–16	8–13	5	8	0.082
3/4	13–15	9–14	6	8	0.090
1	12–14	10–16	7	10	0.111
1 1/2	10–12	12–18	8	12	0.128
2	9–11	12–18	9	16	0.147
2 1/2	7– 9	16–24	10	16	0.169

Source: Lukens Steel Co.

sure-sensitive paper. After forming, the protective coating can be stripped off easily.

Hot-Dipped Metals—How about metals precoated by hot-dipping? How do they stand up to forming? Zinc-coated metal has excellent forming traits. It withstands all severe forming operations including spinning, deep drawing, crimping, roll forming and lock seaming.

The tight, zinc coating does not flake, peel, or separate from the steel. The tight durable coating literally flows with the base metal.

For example, you can take a strip of galvanized steel, cut slits in it about 1/16 in. apart, then expand it into a lattice-like sheet—called metal lath.

Survives the Test—This is probably one of the most brutal tests put to zinc-coated steel. Yet, the zinc coating does not come off.

The K-gutter is another complex shape to produce. There are multiple bends and sharp corners. Yet, gutters are rolled in quick succession—600-800 per hour—on one machine without cracking the tightly adhering finish.

Forming of zinc-coated steel can be easy. Die clearance should be somewhat greater than when drawing uncoated mild steels. For best results, presses should be of the slow, double-action type.

Almost any standard drawing lubricant may be used. It may be applied by oiled rolls or by spraying or brushing. If sprayed or brushed, the amount should be adjusted by the operator for best results.

Can It Be Cleaned?—The lubricant you select should depend on the cleaning methods in your plant. It pays to be careful of pigmented lubricants or heavy soap. They are difficult to remove.

Forming rolls or dies should be kept highly polished. When roll forming, kerosene or a light straw oil is satisfactory as a lubricant. Ordinarily, brake forming does not need a lubricant.

Aluminized steel can withstand moderate forming, drawing, and spinning operations. But this material is not recommended for drawing operations.

It can be bent 180° cold over a diameter equal to twice its own thickness without peeling or flaking of the coating. However, when equipment will be operating at above 1100°F, a more generous bend radius helps. Why? To prevent crazing of the coating and insure maximum heat and corrosion resistance at formed areas.

Properties Act as Guide—Procedures for forming clad metals vary. Each metal combination takes individual study.

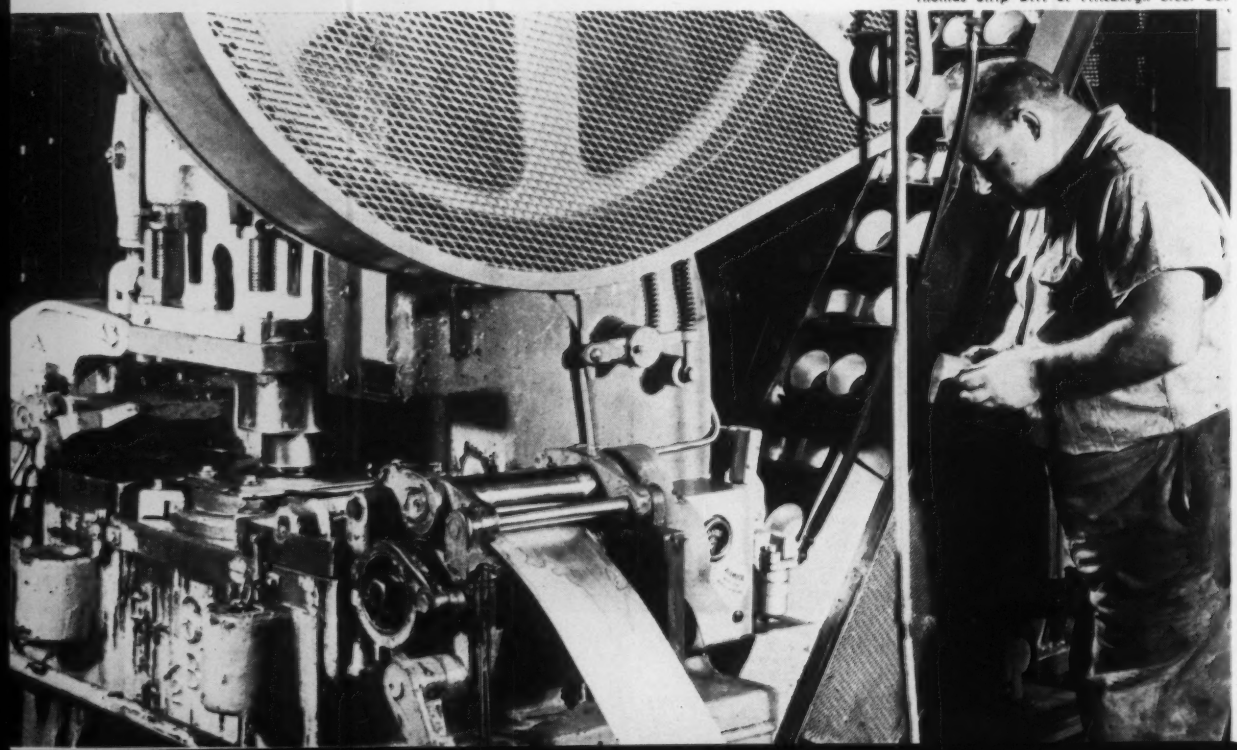
Blanking and forming, spinning, and drawing are possible. A rule of thumb is to use the physical properties of the less ductile material layer as a guide.

One exception to the rule is stainless-clad copper strip. Deep draws have been reported which would be considered excessive for solid stainless steel. It may be that the copper improves the drawing properties of the steel.

Beware of Fracture—When doing deep drawing or other severe operations, take care that the cladding layer is thick enough to prevent fracture.

DRAWS PRECOATED STRIP: Key to the use of copper-coated steel for flashlight cases is its formability.

Thomas Strip Div. of Pittsburgh Steel Co.



This fracture usually occurs with thin gage materials. Either the clad layer is too small a percentage or it is the harder of the two bonded metals.

The fracture can not be blamed on the bond. Rather, it is because the thin layer was stressed beyond a point that even a single metal of equivalent properties or thickness could not endure.

Treat Plates with Care—Handling in the shop of large clad plates such as stainless or Monel on steel, takes the care due high-alloy materials.

Rolled matter, such as scale, is a common fabrication-caused defect. Thus, rolls used for forming clad materials should be thoroughly cleaned. When roll-forming cylinders of clad steel, good practice is to cover the rolls with heavy brown paper.

Shearing and punching should be done with the clad side up to throw the burr on the steel side.

If the job calls for severe bending or forming, it's best to anneal the material. Allow for spring-back; make radii as large as possible; allow for the lower ductility of the straight - chromium - stainless clad steels in both design and fabrication.

Smooth Cuts—Flame cutting of stainless clad materials gives clean and smooth cuts. You can use the same equipment as with carbon steel.

But there is a slightly different procedure. Oxygen cutting pressures are lower; larger cutting tips are required.

Claimed to be the best technique for flame cutting of stainless clad steel is the use of oxy-acetyelene, natural gas or propane with low oxygen pressure. Cutting is from the backing-steel side.

Clad Side Down — The plate should be positioned with the cladding down. Why? So that the flame will first strike carbon steel. For best flame operation, it helps to have a large pool of molten iron before flame cutting into alloy steel. And to protect the surface from damage, it helps to block the clad steel on wooden strips.

Suppose you have to machine these large plates. Speeds and feeds for the backing plate can be the same as for mild steel. But, for the clad side, it is recommended that the speeds be a little lower than those used for carbon steel. And feeds should be firm.

With chromium-nickel stainless claddings, the tool should not be allowed to ride the clad surface; the material will work-harden and gall.

Diffused Case Holds Up—How about steel that has its surface impregnated by diffusion? When chromium diffuses into steel, it becomes an integral part of the base metal. And on steels with low-carbon content, the case is highly ductile. Thus, it should not peel, spall or flake—even under severe working conditions.

Thus, whether metals are precoated by electroplating, hot-dipping, cladding or diffusion, it can be seen that subsequent forming presents no major problems.

This characteristic of precoated metals is, in part, responsible for the increasing shift to the use of these materials.

SAVES DIE: Gage uniformity of electrolytic tin coated steel contributes to long die life when stamping radio chassis.

Jones & Laughlin Steel Corp.

How to Join Precoated Metals

The success of precoated metals is based, in large part, on their joinability. Since these materials are in the finished form, there may be some exceptions to general practice.

Some approaches, if followed, will make the job that much easier.

■ How about joining these precoated metals? Joinability is an important factor in any production line. It is especially vital when using precoated metals. For the popularity of these materials hinges on the fact that they need little or no finishing after joining.

Actually, precoated metals present no great problem. They respond to soldering, brazing, or some welding process. No complicated or laborious techniques are needed.

Points to Consider—But since we are dealing with a combination of metals—and in a finished form—there are some points that should be considered.

Take electroplated metals for example. Spot welding is a successful joining method for light-gage steel-base materials. For heavier gage materials, manual arc or inert gas-shielded welding is used.

Good spot welding practice calls for polished electrode tips. When practiceable, they should be internally water cooled to remove heat from the parts and eliminate discoloration. Moreover, it pays to clean them at frequent intervals. Keep electrode force low to minimize marking. Welding time should be as short as possible.

Welds Steel First—Normal practice with nickel plate is to weld the steel side first—as close to the nickel side as possible. Then back chip or grind the nickel side to sound steel weld metal before further welding.

Oxidation of the nickel side need be no problem when welding the steel side first. Just keep a low heat input and coat the nickel with anti-splatter or lime wash.

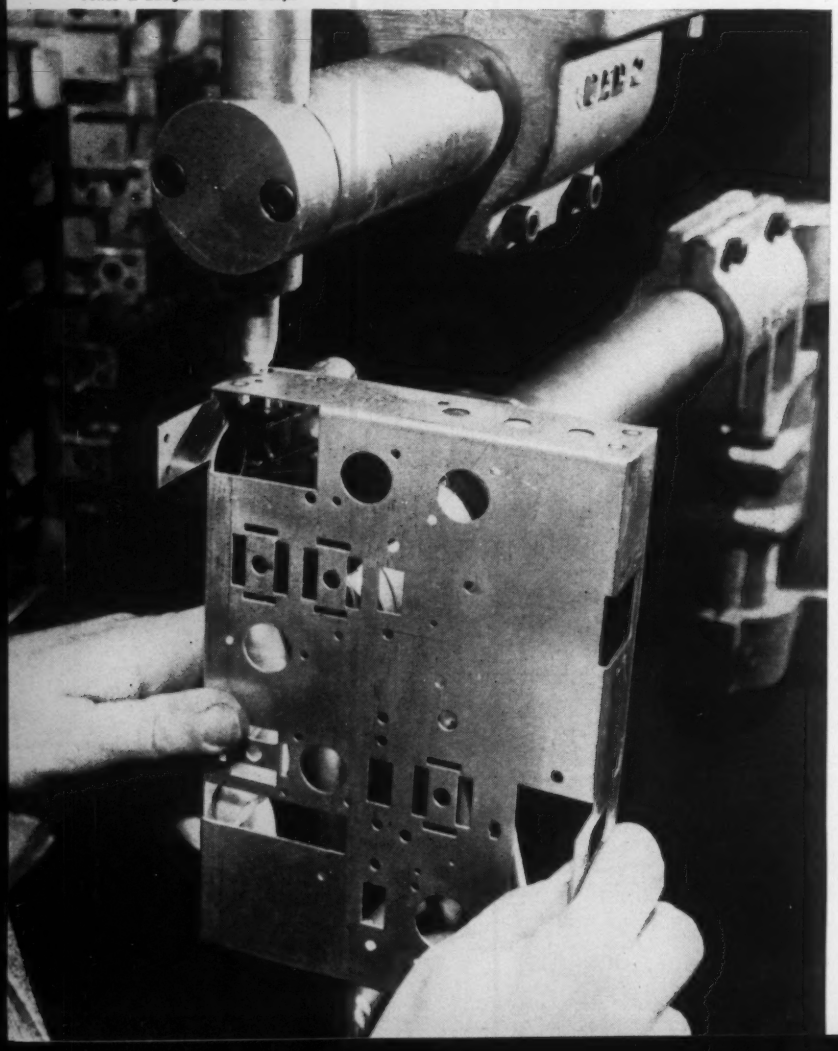
Soldering is recommended for those electroplated metals with zinc, copper, or brass bases. A paste flux should be used.

If the surface is chrome plated, first remove some chrome from the area to be soldered. Scraping or use of an acid can be used to expose the more solderable undercoat.

Can Be Riveted—Plater metals take to other methods of joining—such as riveting and seaming—just as easily as unplated.

The only precautions for riveting are: to take care that the hammer blow does not mar the bright surface; to cold rivet because the heat of hot riveting may oxidize the plated surface.

Jones & Laughlin Steel Corp.



WELDS EASILY: Fast, clean welds are two important reasons why radio chassis is fabricated from heavy-gage, electrolytic-tin-coated steel.

Armco Steel Corp.

CLEAN ELECTRODES: Good spot welding technique calls for removing the oxides from the electrodes with fine emery cloth at frequent intervals. This gives the electrode better electrical contact.

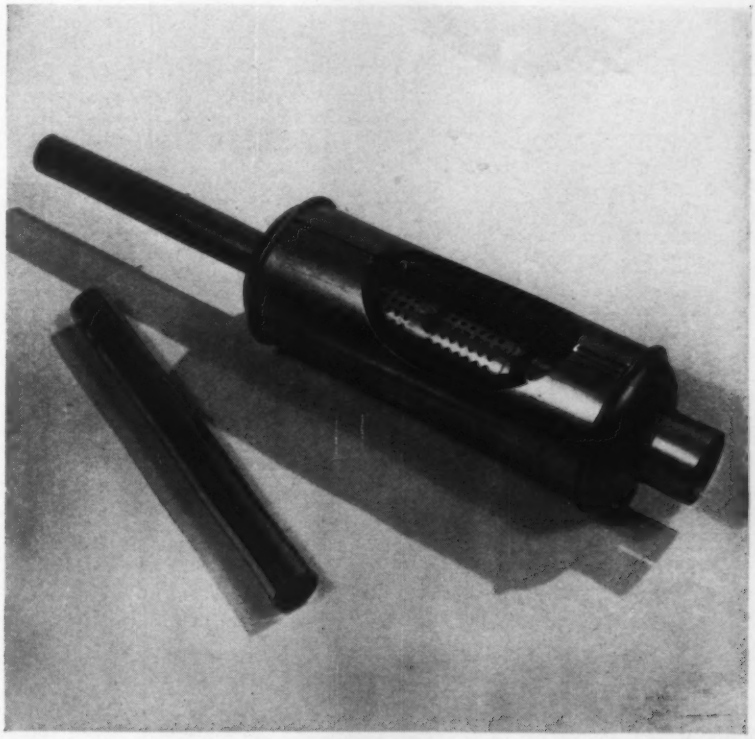
For seaming, the tips for bending apply. Keep tools and machines nick-free. Use a generous radius. For side-locked seams, a thick-edge machine is recommended over a burring machine.

May Burn the Zinc—Galvanized steel can be welded by most of the common methods. Resistance welding by spot, butt, or flash techniques is preferred. Less coating is burned off with these methods.

Spot welding of zinc-coated steel takes about 25 pct higher current than cold rolled steel. A shorter period is required. And slightly higher pressure prevents the zinc from vaporizing.

For fusion welding, a welding jig is needed. It prevents warping, conducts away heat, and helps insure a good weld. The jaws should be kept close to the weld edges and tightly closed to prevent excessive expansion and contraction.

Corrects for Fumes—Two problems arise when fusion-welding zinc-



Armco Steel Corp.

USES TWO TECHNIQUES: Spot welding is used to join interior parts of aluminized steel tractor muffler. The shell is sealed by seam welding.

coated steel: fumes and absorption of gaseous zinc by the weld deposit. Use of a mask by the operator and proper air circulation solve the first problem. Electrode position takes care of the second.

If the metallic electrode is held high enough above the joint, the zinc oxide fumes will be able to escape. The electrode should also be directed slightly ahead of the weld pool. Otherwise, the technique for welding zinc-coated steel is much the same as for uncoated mild steel.

When you're using the carbon electrode and filler rod approach it helps if the filler rod is large enough to lay down the desired width of bead without a weaving motion of the carbon.

A rule of thumb is to have the filler rod about ¾ the thickness of the sheet metal. A low melting point rod, such as bronze is preferred. It means that less of the zinc coating will be oxidized.

Protect Against Rust—After welding, scales and oxides must be removed, and the welding areas recoated. Otherwise, they may rust. Cleaning the welded joint can be by sand-blasting or grinding. Recoating can be by soldering, metal spraying, painting, dip soldering, or use of coating powder.

It's possible to join zinc-coated sheet by oxyacetylene brazing. Use a coated bronze filler rod with a neutral flame. Moving the filler rod back and forth to give a ripple effect gives best results.

Zinc-coated steel can also be soldered. But it must be properly fluxed to give a good joint. One good flux consists of a mixture of cut acid, raw acid, denatured alcohol and water. There are a number of others.

A point to note is that any flux used should be washed off with cold water or wiped clean with a damp cloth.

Welds Aluminized Steel—To join aluminized steel, any of the standard welding methods may be used. Resistance spot and seam welding are especially suitable since they do not greatly affect the corrosion resistance. But parts must be very clean.

Spot welding of aluminized steel —as with galvanized steel—takes more current than uncoated steel. The reason is its conductivity. But as the thickness of the sheet increases, the amount of extra current needed decreases.

Inert-gas-shielded welding is suitable for aluminized steel. The inert gas, either helium or argon, protects the coating and prevents a heavy oxide formation. No flux is required.

But when welding thin-gage material, it helps to remove the coating about 3/16 in. back from the joint. This insures high-quality, ductile weld deposits.

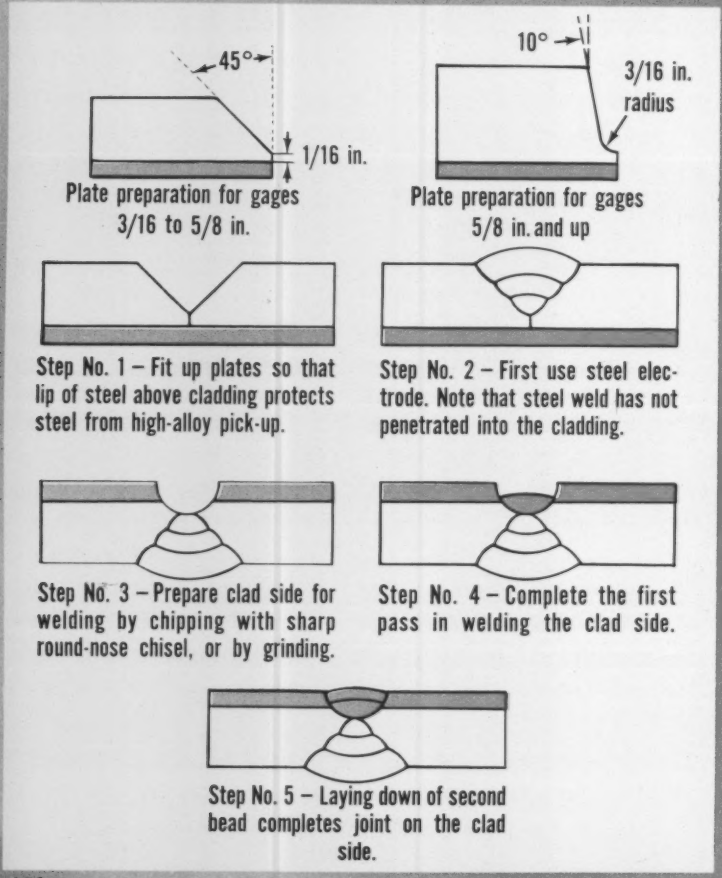
Porosity Occurs—Fusion-welding techniques can be used to join aluminized steel. But any aluminum oxide that is formed tends to prevent steel to steel contact. It also increases weld porosity.

If it's necessary to oxy-acetylene weld, certain practices should be followed. Flux should be applied to both sides of the parts to be joined and to the welding rod. Use the smallest burner tip possible and chill plates to reduce the damaging effects of the high heat generated.

Though no practical method has been developed for soldering aluminized steel, it is possible to obtain high-strength brazed joints. Preferred are silicon-bronze rods with a suitable flux. Aluminum-alloy braz-

One Way to Weld Clad Steels

Lukens Steel Co.


45°
1/16 in.
Plate preparation for gages 3/16 to 5/8 in.
10°
3/16 in. radius
Plate preparation for gages 5/8 in. and up
Step No. 1 – Fit up plates so that lip of steel above cladding protects steel from high-alloy pick-up.
Step No. 2 – First use steel electrode. Note that steel weld has not penetrated into the cladding.
Step No. 3 – Prepare clad side for welding by chipping with sharp round-nose chisel, or by grinding.
Step No. 4 – Complete the first pass in welding the clad side.
Step No. 5 – Laying down of second bead completes joint on the clad side.

ing rods will join the aluminum-coated edge of the steel but will not give a steel-to-steel joint.

Cladding Is Factor—How about joining clad metals? The procedure depends on the metal components and the thickness of the clad plate. But care should be taken that the cladding does not fuse with the core or backing metal. This may result in an unwanted alloy at the surface.

Most clad metals can be either brazed or welded. However, when dealing with copper or a copper alloy base, it may be difficult to obtain a good weld.

The advisable procedure for welding clad steel plate is to weld the steel side first and then the clad side. Moreover, it's recommended that when welding the clad side, the welding electrode or wire should be more highly alloyed than the cladding metal.

Uses Two Electrodes—A common method for welding clad steel plate is known as the composite or dual-electrode method. The steel side of the plate is welded with a matching steel electrode; the clad side of the plate is welded with an alloy electrode. This method calls for careful joint preparation and back gouging.

Another method, preferred by many for welding clad steel plate ½-in. thick or lighter, is known as the full-alloy weld method. An alloy electrode is used for the whole weld.

If you're concerned about the higher weld-metal costs, advocates of the second method point out that simplified joint fit-up and eliminating the back-gouging step offset the higher costs.

Keeps Up Resistance—Steel into which chromium has been diffused can be welded as easily as carbon steel. However, stainless steel electrodes should be used. Thus, the corrosion resistance of the seams will equal that of the body.

Calorized steel can also be welded. In this case, a Type 316 stainless electrode is preferred.

How to Weld Nickel-Plated Steel

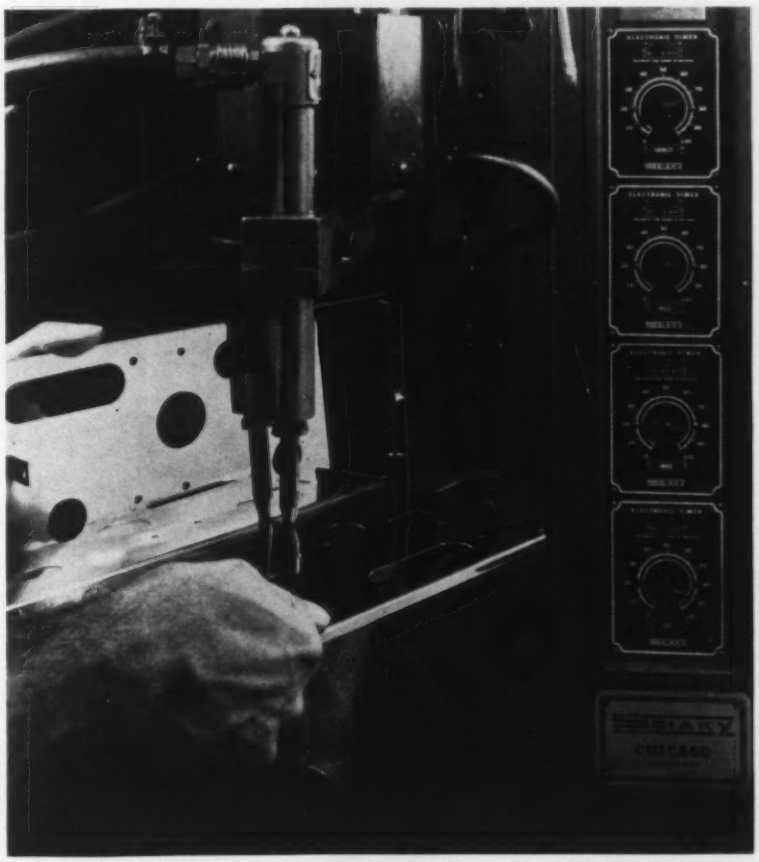
Manual Arc Welding

Electrode Type	Electrode Size, in.	Current Range, amps	Current	Polarity
INCO "131"	1/8	90–110	D. C.	Rev.
INCO "131"	5/32	120–140	D. C.	Rev.
INCO "141"	1/8	90–110	D. C.	Rev.
INCO "141"	5/32	120–140	D. C.	Rev.

Inert Gas Welding

Filler Wire	Wire Diam., in.	Current Range, amps	Volt Range	Welding Speed, ipm	Gas, cfh	Current	Polarity
INCO "61"	0.045	190–220	23–26	18–22	Argon-90	D. C.	Rev.
INCO "61"	0.062	280–320	23–26	32–34	Argon-90	D. C.	Rev.

Colorado Fuel and Iron Corp.



American Nickeloid Co.

JOINS PLATED STEEL: For chrome-plated steel and other plated metals, spot welding is a successful joining technique. But keep electrode force low.

Sensible Buying Boosts Savings

Getting the most for your money involves more than careful selection, forming and joining. Good purchasing practices also help to achieve that end.

■ In addition to the economies inherent in the use of precoated metals, other savings can be obtained by sensible purchasing.

Selection of a precoated metal is, of course, based on the job the metal has to perform. But there are certain other factors that ought to be considered.

Thickness Can Vary—For example, galvanized sheet is supplied with a regular commercial weight of coating. But, if desired, a heavier coating may be specified—depending on gage, surface, and temper needs. Though, a heavier coated sheet costs a little more, it may give far superior corrosion resistance.

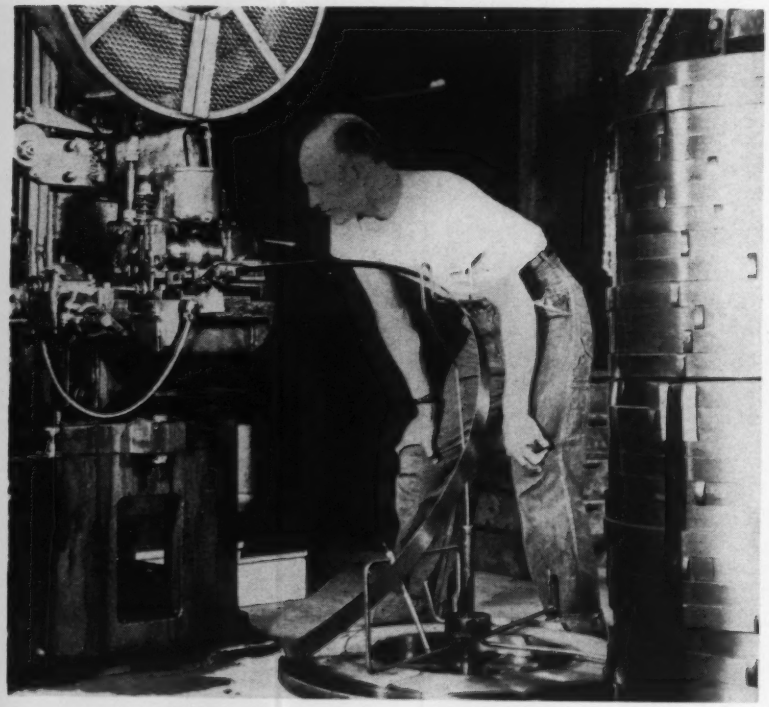
Preplated materials can be delivered slit to your specifications. However, there are usually extra costs for small quantities.

Is it possible to get electroplated stock with the edges coated also? The answer is yes. But one manufacturer estimates that, depending on size and quantities involved, coated edges can increase the cost from 10-20 pct. Still, this is less than if the fabricator tries to mask and plate the edges himself.

How to Order — When buying clad steels, there are certain opportunities for economies that are often overlooked. For example, when you order a clad-steel plate, do not specify "minimum" percentage unless it is a design necessity. It might cost you an extra 2 pct. Instead, order the cladding by "nominal" percentage.

If you order "10 pct minimum" cladding, you get metal rolled to between 10 and 17 pct. You pay for 12 pct. If you order "10 pct nominal," you get metal rolled to between 8 and 15 pct. You pay for only 10 pct.

Another point to remember is that the higher grade steels are often the most economical. Again, we'll use the example of a clad-steel plate. Suppose you order a low-cost, general-purpose steel as the base material. The extra needed thickness may more than offset the extra cost of a high-alloy backing steel. Thus, the careful selection of a backing steel can permit as much as a 17-20 pct reduction in metal cost.



LARGE COILS: Using precoated metals, slit to your needs, streamlines production. But there are extra savings when you order large lots.

Acknowledgements—The editors are grateful to the many companies that have helped to make this feature possible. Special thanks go to: Aluminum Co. of America; American Chain & Cable Co., Inc.; American Nickeloid Co.; American Silver Co., Inc.; Apollo Metal Works; Armco Steel Corp.; Bethlehem Steel Co.; The Calorizing Co.; Chromalloy Corp.; Fabrite Metals Corp.; Jones & Laughlin Steel Corp.; Kassel Industries, Inc.; Leach & Garner Co.; Lukens Steel Co.; Metals & Controls Div., Texas Instruments Inc.; Superior Steel Corp.; Sylvania Electric Products Inc.; Thomas Strip Div., Pittsburgh Steel Co.; Weirton Steel Co.; Wickwire Spencer Steel Div., The Colorado Fuel and Iron Corp.

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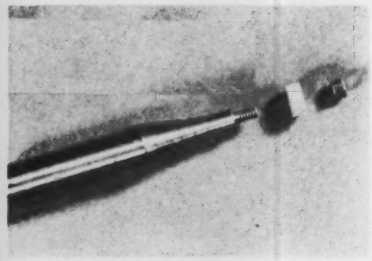
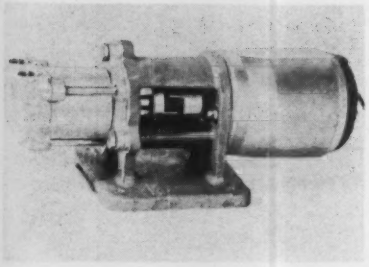
New Materials and Components



Grinding Wheels Cut Production Costs

Nearly as small as the eye of a fly, small grinding wheels promise to save producers of miniature devices a considerable amount of money, annually. The major saving is in productive costs, since now only the wheel need be replaced. The new wheels will replace an older system in which the abrasive was permanently bonded to a tool shaft. With the older method it was necessary to retool the job, a time-consuming, delicate operation. (Bay State Abrasive Products Co.)

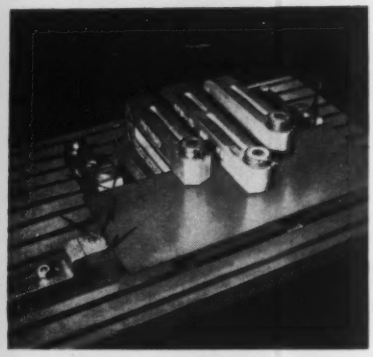
For more data circle No. 39 on postcard, p. 171



Pump and Motor Combine To Form Integral Unit

Developed to be run from an ordinary 12-v dc battery, a pump-motor combination offers non-corrosive construction. Designed for water and similar fluids, the pump incorporates a bronze body, stainless-steel rotor, carbon vanes and Graphitar bearings. A 0.07-hp series-wound dc motor, rated for 2300 rpm, is combined with a special pump with a capacity of 25 gph at 60 psi. A bracket and coupling combine the two, providing good alignment. (The Tuthill Pump Co.)

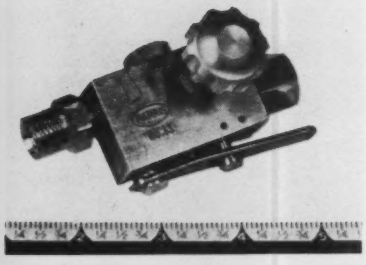
For more data circle No. 40 on postcard, p. 171



Magnetic Connection Gages Punched Work Pieces

Magnetic work stops insure accurate gaging of all work pieces, by eliminating "bounce back" as the work piece hits the gage. The stops also do away with the necessity for the operator to hold the part against the stops, during hole punching and notching operations. The magnetic attraction holds the work piece snug against the device. Permanent magnetized blocks are an integral part of these complete stops. The work stops are designed for universal mounting on templates, "T"-slotted plates and press brake bed rails, in combination with either of the company's two hole punching and notching units. (Punch Products Corp.)

For more data circle No. 41 on postcard, p. 171



Oxygen Saver Reduces Gas Consumption

For single torch, cutting machine operation, a duo-control oxygen saver permits the use of high-heat flame for instant starts. When actuating the pre-heat oxygen control lever, the flame needed to support continuing cutting action is reduced to a minimum. The oxygen saver gives up to 70-pct reduction in the amount of pre-heat gases used. There is less hardening of surface cut, no rounding of kerf edge, and slag is eliminated, resulting in cleaner cuts and less cleaning time. The oxygen saver weighs only 12 oz. This is an important factor when considering portability of cutting machines. (The Harris Calorific Co.)

For more data circle No. 42 on postcard, p. 171

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How MOTOROLA punches TV chassis faster and cuts scrap loss. Typical of how a **M**ultipress **A**nalysis **P**rogram can help you **MAP** superior production methods.

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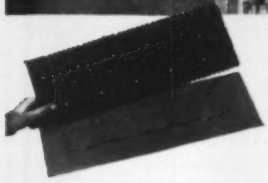

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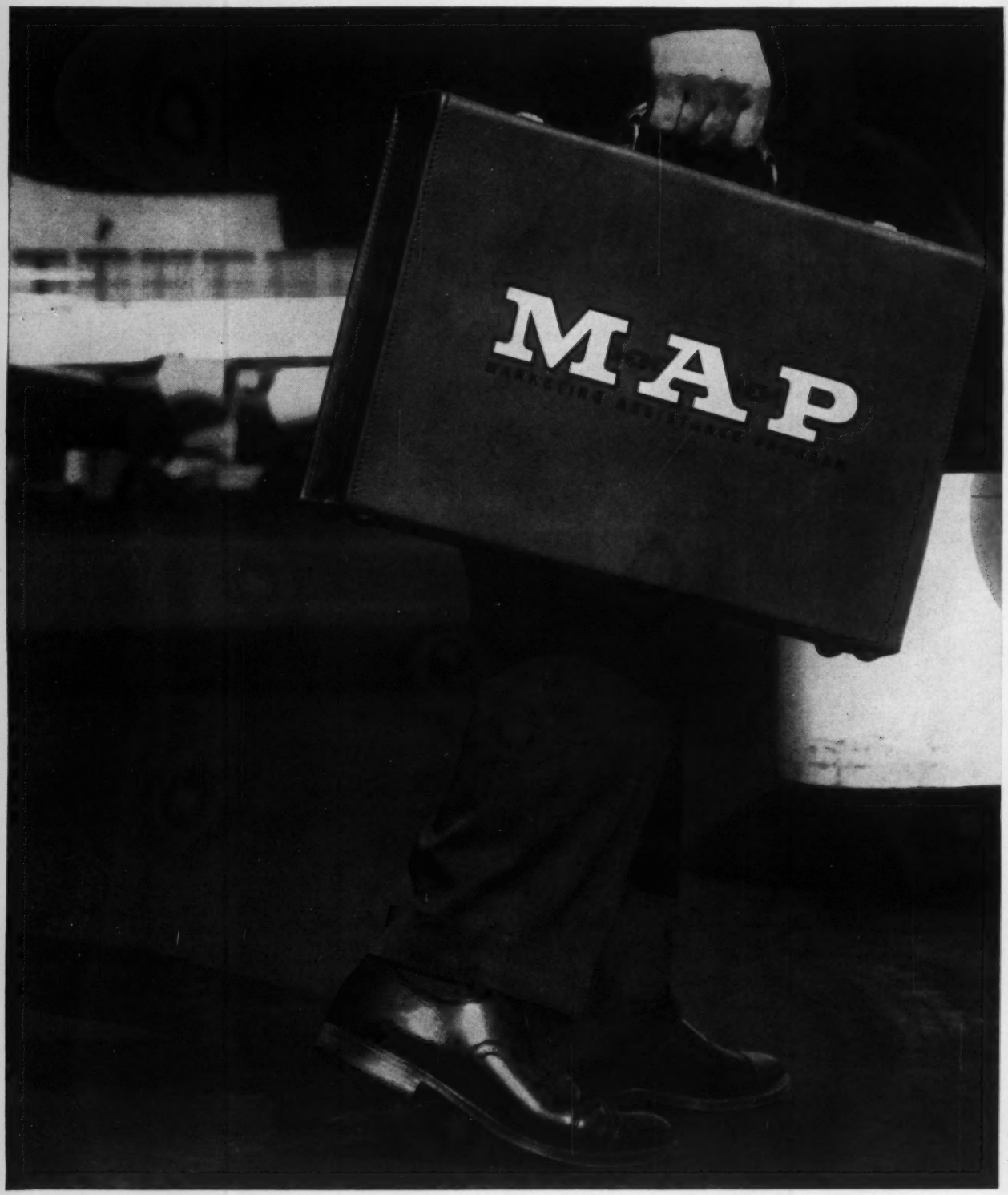

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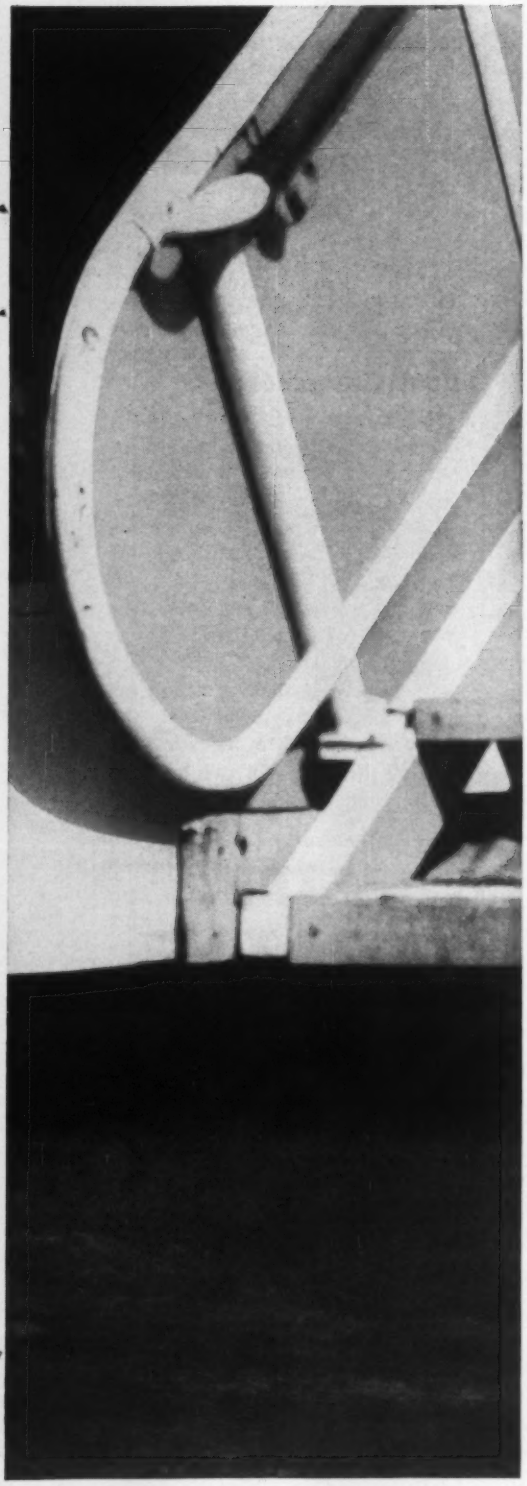

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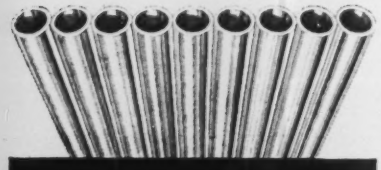

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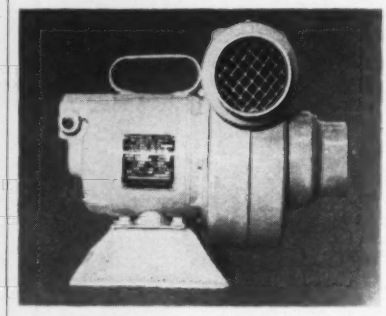


service, indoors or out, and are both waterproof and vaporproof. The eight-bladed, balanced impeller, the housing and other parts are of cast No. 43 aluminum alloy. This alloy resists the action of a number of corrosive materials. (Manhattan Electric & Maintenance Co.)

For more data circle No. 43 on postcard, p. 171

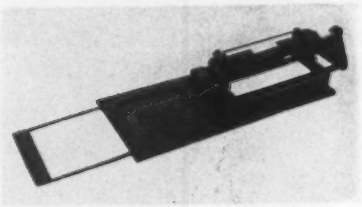
Insulating Material

An insulating material combines the good electrical properties and mechanical strength of vulcanized fiber, with the low-moisture absorption of phenolic laminates. This new material has two to four times the moisture resistance of conventional vulcanized fiber. A few of its applications are: circuit-breaker barriers, transformer barriers, instruments and control panels. (National Vulcanized Fibre Co.)

For more data circle No. 44 on postcard, p. 171

Slide Gates

For service in the chemical, food and pharmaceutical industries, slide gates attach to existing duct work, hoppers, screw conveyors, bucket elevators or other process machinery. They control or shut off the flow of bulk materials. Slide Gates feature a cut-out extension which matches the flange openings when the gates are full open. With this arrangement the track is always filled with a part of the blade affording smooth operation at all times. (The Bucket Elevator Co.)



For more data circle No. 45 on postcard, p. 171

Dust Collectors

Highly efficient, an automatic filter shaker is available on all models of cloth filter-type dust collectors. In addition to insuring peak operating efficiency, by thoroughly shaking the filters each time the dust collector is used, the self-cleaning device eliminates the chance of a workman forgetting to manually shake the filters when the need arises. Shaking action begins automatically whenever the collector motor is turned off. After shaking the filters for two minutes, the mechanism shuts itself off and

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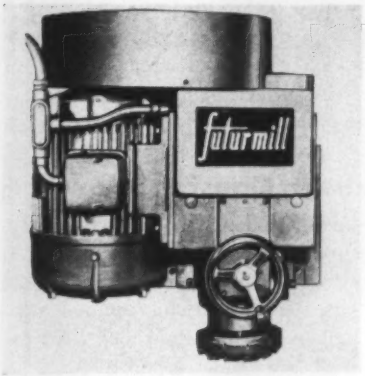
Phone: ESsex 5-4300

will not operate again until the collector has been turned on and off again. (Torit Mfg. Co.)

For more data circle No. 46 on postcard, p. 171

Milling Spindle

Designed for converting planers and older machines to competitive, rapid metal removal machinery, a milling spindle has an adjustable speed range from 125 to 1100 rpm; spindles range from 10 to 25 hp. Top operating efficiency is obtained with a geared, changeable timing

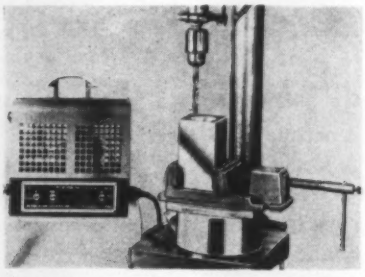


belt which produces a cushioned and positive spindle drive. The spindle is mounted in heavy-duty precision roller bearings; has a 6-in. quill adjustment; weighs less than 1200 lb in the 10 and 15 hp models. (Futurmill, Inc.)

For more data circle No. 47 on postcard, p. 171

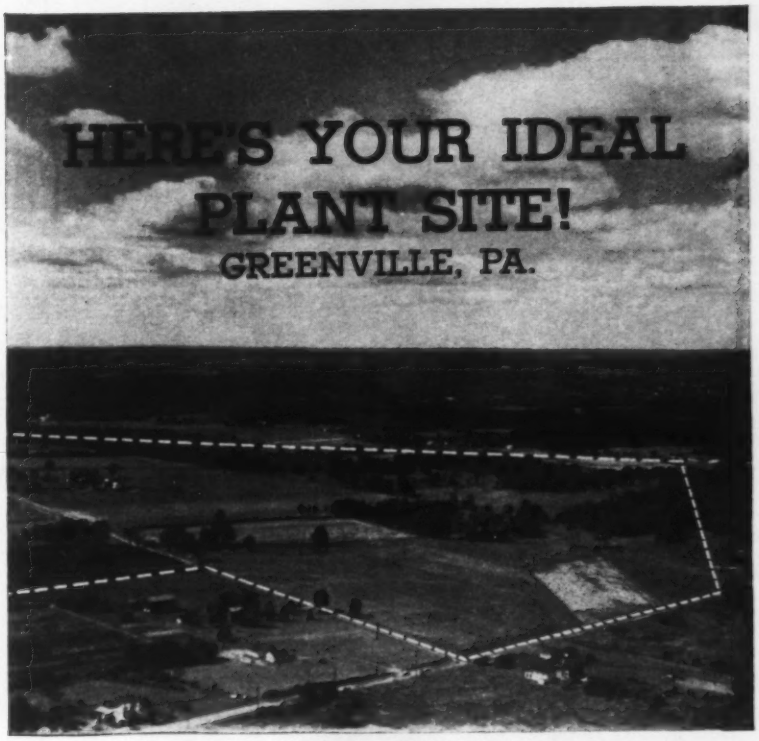
Holding Vise

An electro-magnetic base with vise insures positive position when used on drill presses, tapping or milling machines. It eliminates 75 pct of setup time, and will increase

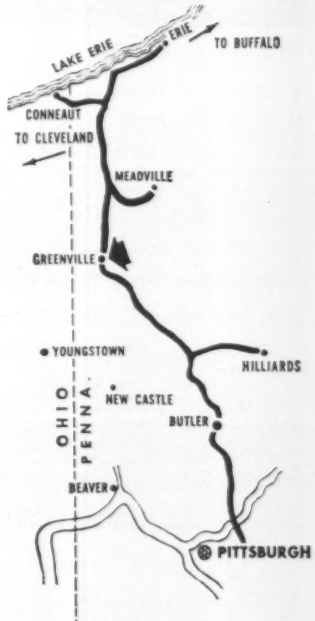


production and save many hours of costly labor. This device completely eliminates hold-down clamps, bolts, or drilling of table top. (Redmer Air Devices, Inc.)

For more data circle No. 48 on postcard, p. 171



Attractive, Level, Flood-Free Land Close to Metropolitan Markets of Pittsburgh, Cleveland and Buffalo



This adaptable 750 acre plant site is ideally located adjacent to Greenville, Pa., and is only 80 miles from Pittsburgh and Cleveland; only 150 miles from Buffalo. Next day rail delivery to these points.

Extensive deposits of coal, limestone, clay and aggregates nearby. Steel and other basic materials available with 24-hour delivery service.

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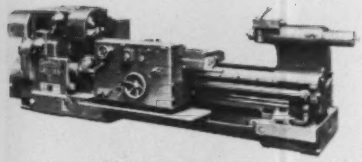
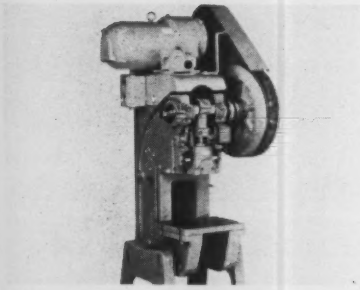


Threading Lathe Threads Forms of All Types

Semi-automatic, a single-point threading lathe generates very accurate lead and thread forms of all types. These include single or multiple start, coarse or fine, left- or right-hand, straight or tapered and either internal or external threads. The machine does not require skilled labor to load, start the threading cycle or unload the work. Only 15 minutes or less are required to set up the standard machine for most jobs. This machine handles a great variety of work. (Gisholt Machine Co.)

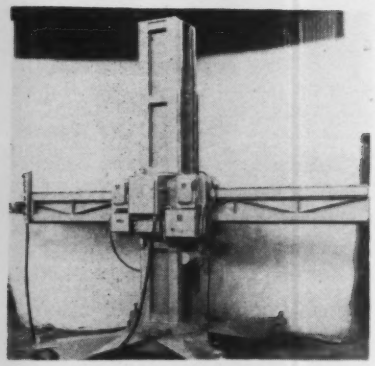
For more data circle No. 49 on postcard, p. 171



Variable-Speed Presses Deliver Constant Power

Delivering constant power throughout a 4:1 speed range increases the effectiveness of a line of presses, in all-around press-room application. The design is well suited for most economical high-speed blanking work, as well as the requirements of slow-speed drawing operations. Standard models come in 5-, 8-, 12-, 15-, 18- and 26-ton capacities. The presses adjust to stroke at optimum speed for the needs of a particular setup, when employing automatic feed. An extra-large diameter and heavier flywheel insure a smooth press power stroke. (Kenco Mfg. Co.)

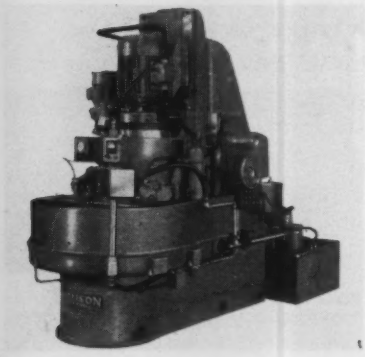
For more data circle No. 50 on postcard, p. 171



Manipulator Offers "Twin-Post" Construction

A ram-type manipulator comes in combinations of horizontal and vertical travel—from 6-24 ft, in 2-ft increments. The machine offers twin-post construction; a pair of heavy vertical columns carries the ram saddle. A twin rack and pinion drive accomplishes elevation. One rack is mounted on each of the vertical columns. A brake motor supplies the power. The ram travel is also rack and pinion driven. The controls for the unit are contained in a pendent station, in a socket at the front end of the ram. The station is quickly demountable and can be operated from the floor if desired. The tower rotates 360° on a very large diameter ball thrust bearing. (Berkley-Davis Inc.)

For more data circle No. 51 on postcard, p. 171

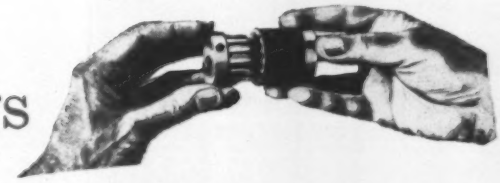
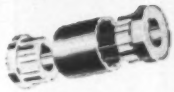


Surface Grinder Grinds Flat Surfaces

For machining flat surfaces, a rotary indexing surface grinder holds the work in a stationary fixture under a wheel spindle. The spindle orbits as it rotates. The grinder reduces cost of grinding pieceparts to close flatness tolerances. The piecepart remains fixed and lets the wheel axis revolve around its center point. This method of generating flat surfaces has three economic advantages: The process is ideally suited for grinding from the rough on transfer-type machines; equipment costs are reduced; machine utilization is increased and very high production rates are possible. Another advantage is in grinding thin parts; the wheel covers the work-surface area evenly. (Mattison Machine Works)

For more data circle No. 52 on postcard, p. 171

US RUBBER **PowerGrip** FLEXIBLE COUPLINGS

These couplings  are so simple in design  that their cost is LOW compared with other couplings. Insist on having U. S. PowerGrip Flexible Couplings tried on your machinery and then watch your costs go down. Installation is quick and easy. No maintenance, no lubrication. Call now!

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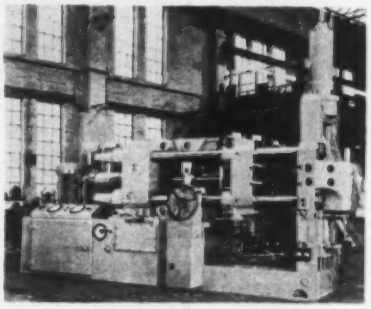
NEW EQUIPMENT

Die Casting Machine

High-speed injection, die casting machines are suitable for all nonferrous alloy metals. They have interchangeability of their casting heads, offering two process setups in any particular case: for the cold-chamber method with either vertical

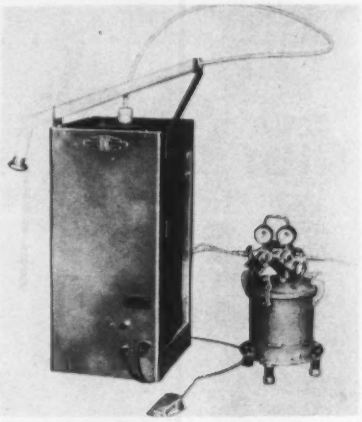


or horizontal pressure chamber, or for the hot-chamber method. Selection is determined by the shape of the workpiece, material, and special technical requirements of the casting. (Eric P. Cahn)

For more data circle No. 53 on postcard, p. 171

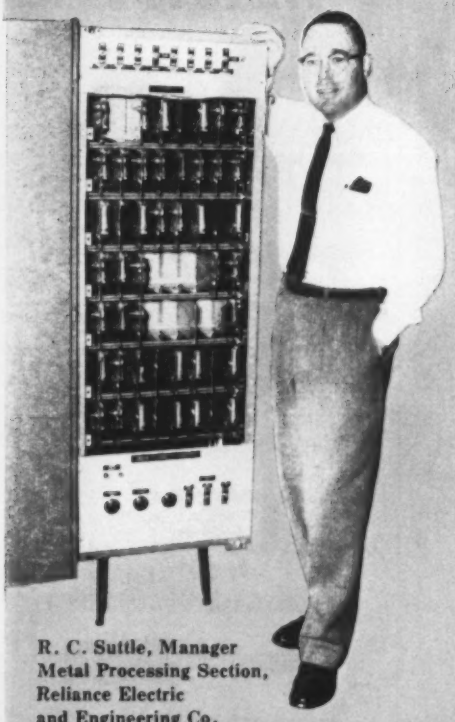
Hand Spray Gun

A portable, high-speed, centrifugal-type electrostatic hand gun applies both metallic and nonmetallic paints and coatings. It can be used both for indoor and outdoor work. Utilizing the principle



of electrostatics to charge and guide pre-atomized particles of coating material to the objects, it creates "wrap-around" and thereby minimizes overspray. The hand gun installs easily into existing systems, makes possible quick color changes,

"Reliance V★S drives give American Can accurate system control for high-speed production."



R. C. Suttle, Manager
Metal Processing Section,
Reliance Electric
and Engineering Co.

"Precise system control for acceleration, deceleration and shearing is a vital contribution to this cut-to-length tin sheet line. A VSC voltage regulator controls acceleration on the unwind and leveler sections, and provides stepless speed changes. Unwind tension is accurately controlled by a VSR current regulator . . . and the entire drive is powered by Reliance D-c. motors.

"The speed of the shear is matched to the line by photoelectric loop control, maintaining loop position and assuring accuracy.

"Surface defects in the sheet are picked up visually—pin holes electronically. Mechanical gauges check uniform thickness. Rejects are dropped automatically following the shear. Automatic counting cuts handling time as the usable sheets are stacked on pallets."

These lines were developed by the F. J. Littel Machine Company, Chicago, and American Can Company and are installed in Canco Division plants.

Reliance engineers are ready to help you as they have many others, with a sound understanding of system problems and solutions. Consult your Reliance sales engineer . . . or write today for Bulletin Number L-2505 for complete information. D-1640

Product of the combined resources of Reliance Electric and Engineering Company and its Master and Reeves Divisions

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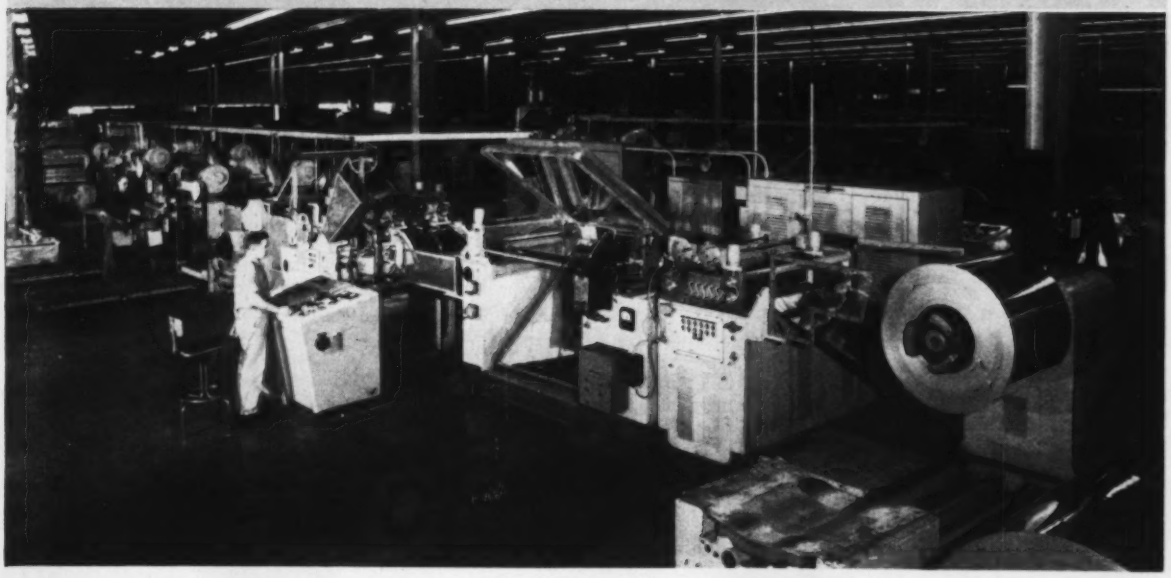
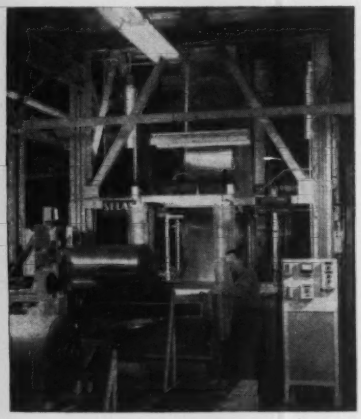
Duty Master A-c. Motors, Master Gearmotors, Reeves Drives, V★S Drives, Super 'T' D-c. Motors, Generators, Controls and Engineered Drive Systems.



THE FINISH IS ONLY THE BEGINNING

To meet demands for perfect finish on stainless and nickel Thinstrip®, Somers installs unique new annealing furnace.



This new Selas vertical continuous annealing furnace assures uncontaminated, commercially unmarred surfaces as well as uniform temper and faster delivery on stainless, nickel and nickel alloy Thinstrip up to 25" wide. But this is only part of the story of Somers' quality. Sendzimir rolling mills, Accu-Ray gauging plus 50 years leadership in thin gauge metals (from .010 down to .000125") are a few of the features Somers offers to assist you with your Thinstrip® problems.

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Somers

Somers Brass Company, Inc.
102 BALDWIN AVE. WATERBURY, CONN.

NEW EQUIPMENT

and requires no special skill for operation. The hand gun weighs only 1¾ lb. (Ionic Electrostatic Corp.)

For more data circle No. 54 on postcard, p. 171

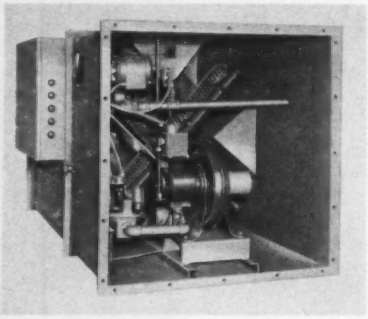
Safety Clothing

A line of asbestos safety clothing sheds molten metal at 3000°F without deterioration, loss of resiliency or discoloration of inner side. The specially-woven fabric offers 40- to 50-pct greater abrasion resistance than ordinary asbestos. It has nearly double the tensile strength of fabrics twice its weight and thickness. Garments made from the new fabric asbestos reflect about 50 pct of radiant heat, and are extremely light in weight. (American Optical Co.)

For more data circle No. 55 on postcard, p. 171

Intake Air Units

Gas-fired air intake units supply make-up air to replace that removed by exhaust systems. Four basic units give a capacity range of from 15,000 to 90,000 cfm (1,000,-



000 to 7,000,000 btu/hr). The basic units include the burner, controls and belt or direct driven fan in a single housing. (Hartzell Propeller Fan Co.)

For more data circle No. 56 on postcard, p. 171

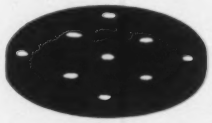
Numerical Control

Employing all-static, all-transistorized circuitry for automatic machine tool control, a numerical-control system consists of five basic units. The basic units include: the operator's control and tape reader, the control unit and the pulse

Maine Quiz #2

Can you identify these metal products produced in

MAINE?



Answers — 1. Weathervane 2. Manhole Cover 3. Tackle Block 4. Machine Gun

Currently 150 metal working plants manufacturing machinery and ordnance parts, fabricated metal products, transportation equipment, and primary metal products are located in Maine. Over 5000 skilled workers produce thousands of machine tooled products daily.

Maine will produce the item of your choice. *Maine is the state for your new plant.* Write for our 56-page directory of the metal working industry in Maine and the *plan for 100% financing of new construction.*

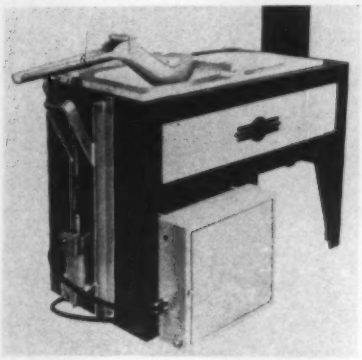
Lloyd K. Allen, Commissioner
Maine Department
of Economic Development
State Capitol Augusta, Maine

generator and drive motors. Operating information is fed into the control unit by the tape reader, which accomodates a 1-in. wide, eight-channel punched tape. The control system controls one to five machine tool motions over the 999.-999-in. span and handles all auxiliary machine-tool functions. (Westinghouse Electric Corp.)

For more data circle No. 57 on postcard, p. 171

Preheat Furnace

Electronically controlled, a ladling device provides a continuous flow of correct-temperature metal to the machine pot of any medium-size zinc die casting machine. The entire unit consists of furnace, ladle, air cylinder, probe holder and probes, liquid-level electronic controller, automatic temperature con-



trol and all fixing brackets and connections. The size of the furnace is compact—28-in. wide by 48-in. long by 30-in. high. Its capacity is 500 lb. A metal partition separator keeps dross and dirt away from ladle bowl. (DCMT Sales Corp.)

For more data circle No. 58 on postcard, p. 171

Tumbling Machine

Vibratory barrel tumbling machines feature electromagnetic vibratory drives for deburring, cleaning, descaling, or most any parts finishing job. The amplitude of vibration can be instantly varied, while the same frequency of 3600 vibrations per minute is maintained. A turn of the rheostat knob on the control box is all that is required to change the amplitude. (Syntron Co.)

For more data circle No. 59 on postcard, p. 171

Automatic flash removal set-up: When part is indexed to flash removal station, drive head pivots this Osborn Master® Wheel brush forward and downward to remove die-cast flash effectively, uniformly. Rate: 600 pieces per hour.

Flash removal time cut in half

. . . with Osborn power brushing

600 pieces per hour . . . automatically—that's the *new rate* for removing flash with Osborn power brushes from this die-cast venturi cluster. Former off-hand methods used by this large manufacturer of automotive carburetors produced only 250 to 300 pieces per hour.

Now, flash removal is incorporated into a special 24-station index machine where Osborn power brushes automatically do the job quickly, effectively. Output is consistent, uniform.

Removing flash from your die-cast parts—especially small, hard-to-handle parts or those with irregular, complex shapes—can be done better, faster and cheaper with Osborn power brushes. In fact, your metal finishing problems of every description—deburring, cleaning, polishing, precision blending—can be solved with advanced Osborn power brushing methods. An **O**sborn **B**rushing **A**nalysis—made in your plant now at no cost or obligation—is the first-step toward improved, less costly production. For details, write or phone *The Osborn Manufacturing Company, Department F-98, Cleveland 14, Ohio. Phone ENdicott 1-1900.*

Osborn Brushes

Metal Finishing Machines . . . and Finishing Methods
Power, Paint and Maintenance Brushes • Foundry Production Machinery

The lady is a killer

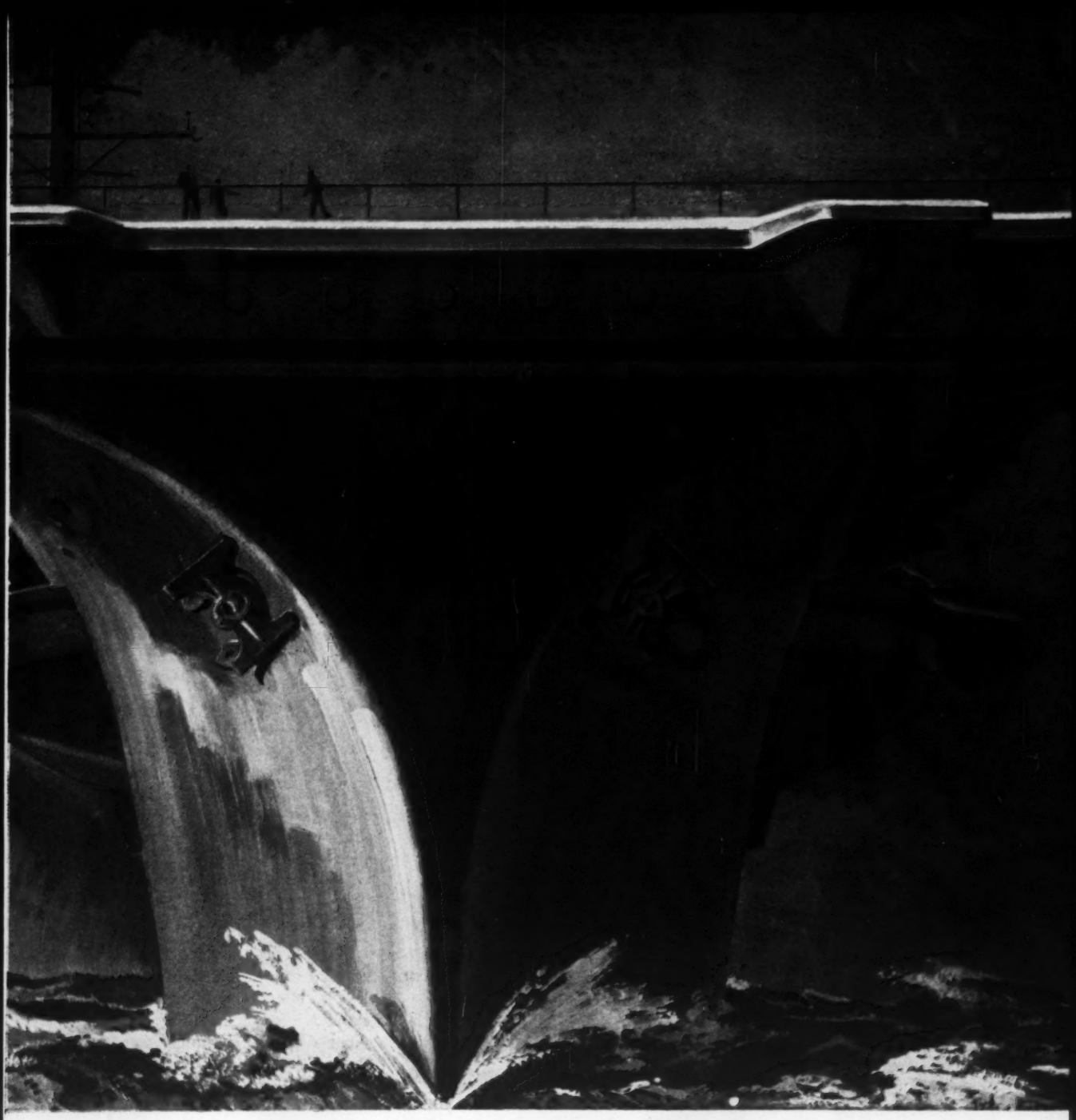
Tough, fast and maneuverable, this is 60,000 tons of fighting ship. She's the Navy's newest and biggest jet-age aircraft carrier—the USS Independence.

This mark tells you a product is made of modern, dependable Steel.

Stowed inside her gargantuan hull are approximately 100 deadly jet fighters. Her armor-plated flight deck stretches 1,000 feet and laps an area of 4 acres. And, she's equipped with four catapults that can snap four jets howling into the air in thirty-eight seconds.

She's fast. The lady easily batters through foam-tipped waves at better than 30 knots. She's maneuverable. The Independence can follow a difficult zig-zag pattern and still cruise a distance of 600 miles in a twenty-four hour period.

To help transmit her great power from eight massive boilers, National Tube supplied over 16,000 feet of USS



National Seamless Pressure Tubes in both carbon and alloy steels for use in steam lines, as well as over 4,000 feet of Standard Pipe. In addition, National Tube also furnished a number of Seamless Steel Cylinders for air actuating systems and recharging breathing units.

For the past 80 years, National Tube has handled tough tubular installations in the fields of line pipe, pressure tubing, mechanical tubing and oil country tubular products. For assistance, write to National Tube Division, United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

USS and National are registered trademarks

National Tube Division of United States Steel

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New Haven Malleable Iron Co., New Haven 4

DELAWARE
Eastern Malleable Iron Co., Wilmington 99

ILLINOIS
Central Fdry. Div., Gen. Motors, Danville
Chicago Malleable Castings Co., Chicago 43
Moline Malleable Iron Co., St. Charles
National Mall. and Steel Castings Co., Cicero 50
Peoria Malleable Castings Co., Peoria 1
Wagner Castings Company, Decatur

INDIANA
Albion Malleable Iron Company, Muncie Division, Muncie
Link-Belt Company, Indianapolis 6
National Mall. & Steel Castings Co., Indianapolis 22

IOWA
Iowa Malleable Iron Co., Fairfield

MASSACHUSETTS
Belcher Malleable Iron Co., Easton

MICHIGAN
Albion Malleable Iron Co., Albion
Auto Specialties Mfg. Co., Saint Joseph
Cadillac Malleable Iron Co., Cadillac
Central Fdry. Div., Gen. Motors, Saginaw

MINNESOTA
Northern Malleable Iron Co., St. Paul 6

MISSISSIPPI
Mississippi Malleable Iron Co., Meridian

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Laconia Malleable Iron Co., Laconia

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Frazer & Jones Company Division Eastern Malleable Iron Co., Solvay
Oriskany Malleable Iron Co., Inc., Oriskany
Westmoreland Mall. Iron Co., Westmoreland

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American Malleable Castings Co., Marion
Central Fdry. Div., Gen. Motors, Defiance
Dayton Mall. Iron Co., Ironton Div., Ironton
Dayton Mall. Iron Co., Ohio Mall. Div., Columbus 16
Maumee Malleable Castings Co., Toledo 5
National Mall. and Steel Castings Co., Cleveland 6

PENNSYLVANIA
Buck Iron Company, Inc., Philadelphia 22
Erie Malleable Iron Co., Erie
Lancaster Malleable Castings Co., Lancaster
Lehigh Foundries Company, Easton
Meadville Malleable Iron Co., Meadville
Pennsylvania Malleable Iron Corp., Lancaster

TEXAS
Texas Foundries, Inc., Lufkin

WEST VIRGINIA
West Virginia Mall. Iron Co., Point Pleasant

WISCONSIN
Belle City Malleable Iron Co., Racine
Chain Belt Company, Milwaukee 1
Federal Malleable Company, Inc., West Allis 14
Kirsh Foundry Inc., Beaver Dam
Lakeside Malleable Castings Co., Racine
Milwaukee Malleable & Grey Iron Works, Milwaukee 46

These companies are members of the Malleable Castings Council

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 171.

Test Equipment

Consisting of 24 pages, a brochure combines specifications and photos on precision turntables, rate tables, air-bearing and fluid-bearing tables, electronic test equipment and consoles and various related products. (Sterling Precision Corp.)

For free copy circle No. 1 on postcard, p. 171

Hole Location Gage

Hole-locating and concentricity gages are shown in an 8-page bulletin. Special gages for checking multiple holes in parts are also shown. (Mayes Tool Co.)

For free copy circle No. 2 on postcard, p. 171

Coal

Handy information to facilitate ordering various grades of coal is contained in a four-page folder. The folder includes tabular data on the name and characteristics of each grade; the mine where it is produced; shipping facilities to insure speedy deliveries; and the different sizes made. (Eastern Gas and Fuel Assoc.)

For free copy circle No. 3 on postcard, p. 171

Circuit Breakers

An 8-page, two-color bulletin deals with rotary-handle circuit breakers and their use in switchboards, control centers, panelboards, and enclosed circuit breakers. Covering the complete line of rotary-handle circuit breakers from 15-80 amp, the bulletin describes fully the features of the rotary-handle mechanism. The breakers are also covered. (Federal Pacific Electric Co.)

For free copy circle No. 4 on postcard, p. 171

Small Limit Switches

Two pages of information, on a series of sub-subminiature, sealed limit switches, are given in a data sheet. The new series features a slim 11/16-in. diam housing; it is completely sealed against the effects of adverse environmental conditions as found in aircraft, missile, railway, marine and mobile applications. (Minneapolis-Honeywell Regulator Co.)

For free copy circle No. 5 on postcard, p. 171

Steel-Alloy Chart

A reference chart contains fifty-five of the more widely used cast alloys in the carbon, low-alloy and stainless groups; also nickel and monel. In addition to all standard data such as composition, and physicals, the chart contains a section for design applications of each steel alloy. (Lebanon Steel Foundry)

For free copy circle No. 6 on postcard, p. 171

Temperature Detector

Details of a resistance-type temperature detector, sealed to prevent contamination, are given in new 2-page product specification. Complete technical details are included along with convenient quotation-ordering information. (Bailey Meter Co.)

For free copy circle No. 7 on postcard, p. 171

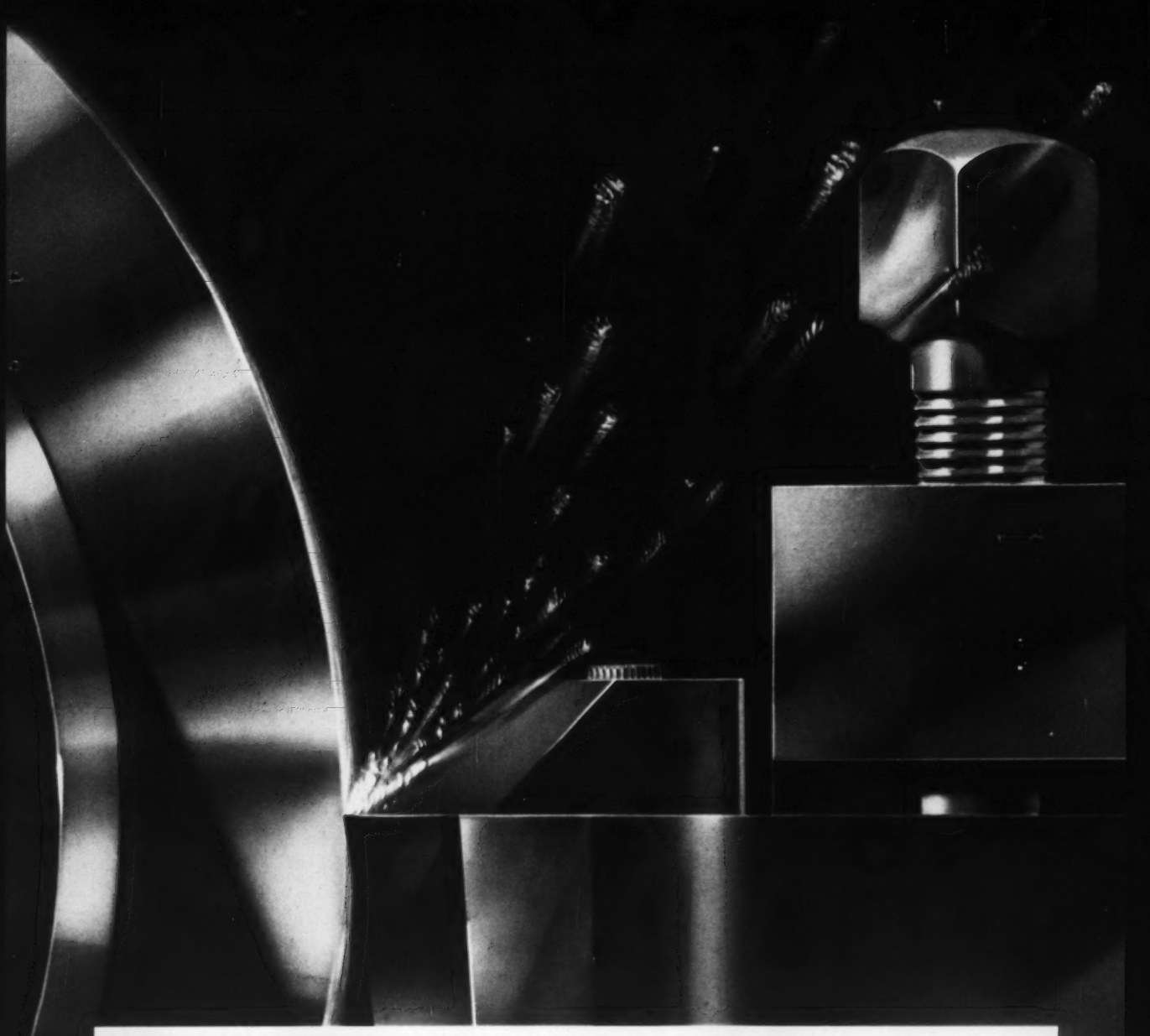


Illustration of Malleable casting being turned at 1,400 surface feet per minute with a 0.100" depth of cut using an oxide tool.

Cut Machining Time and Costs... Use Malleable

It's the **finished** cost of machined components that's important to you. Remember then . . . Malleable iron is the most readily machinable of all ferrous metals of similar properties. With Malleable castings you'll reduce machining time as much as 50% . . . increase tool life up to 250% . . . get unexcelled surface finishes.

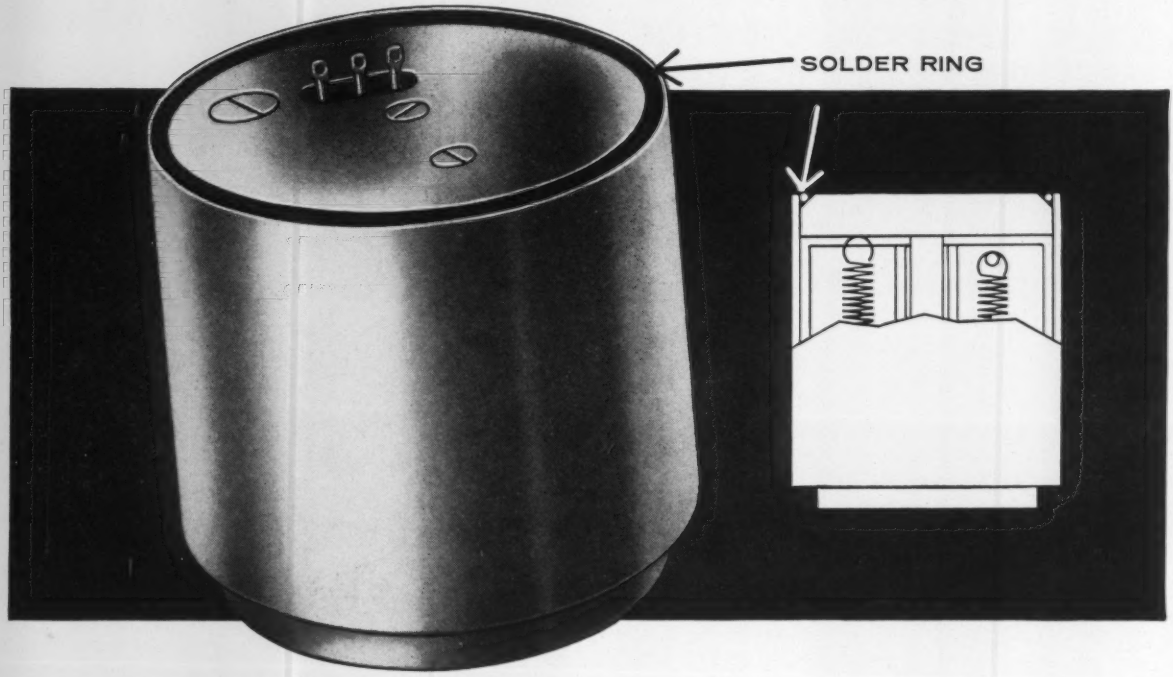
Find out how much you can cut **your** finished parts costs. Contact any nearby Malleable castings producer who displays this symbol—

MEMBER
MALLEABLE
CASTINGS COUNCIL

For detailed information on "Machinability of Malleable Castings", contact any of the progressive companies listed on the opposite page, or Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio.

Precision soldering 7 Times Faster...

with TOCCO* *Induction Heating*



When G. M. Giannini and Co., Inc., Pasadena, California, switched from old-fashioned methods to TOCCO Induction Heating they increased production of these high-precision accelerometers from 4 to 30 per hour—with a commensurate *decrease* in production costs.

Here's what a Giannini official has to say about the TOCCO installation: "Prior to using TOCCO for this purpose, we had tried soldering irons, normal torches, resistance sealing, and even threaded screw fittings, with uniformly poor results. Essentially, the TOCCO unit has permitted us to build, in production quantities, oil-filled hermetically sealed units that could not be produced in any other way."

Whether your production bottleneck involves soldering, brazing, heat treating or heating for forming it pays you to investigate TOCCO as an economical way to do it better, faster and at lower cost.

THE OHIO CRANKSHAFT COMPANY

Mail Coupon Today— NEW FREE Bulletin

The Ohio Crankshaft Co. • Dept. A-6, Cleveland 5, Ohio
Please send copy of "Typical Results of TOCCO Induction Brazing and Soldering".

Name_____
Position_____
Company_____
Address_____
City_____ Zone____ State_____

FREE LITERATURE

Continued

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Box Kilns

Two new bulletins show the complete range and specifications of recently modernized industrial box kilns. One bulletin describes ten models of large industrial box kilns, ranging in capacity from 5.8 to 16.7 cu ft. They are designed for operating temperatures to 2750°F. The other bulletin describes 8 models of small industrial kilns ranging in capacity from 0.73 to 3.3 cu ft. Their operating temperatures are to 2750°F. Both bulletins show typical heating and cooling curves. (Harper Electric Furnace Corp.)

For free copy circle No. 21 on postcard

Flexible Automation

The concept of flexible and versatile automation equipment, and how it is embodied in a member of the manufacturer's family of automation products, are explained in a folder. The literature describes the design and operation of the machine; also the simple means of programming and setup, which permits it to be switched from job to job in one-half hour. The unit is a precise, automatic parts assembler, machine operator, and production "hand," which has created great interest in manufacturing engineering circles. (U. S. Robodyne)

For free copy circle No. 22 on postcard

Epoxy Resins

Many industrial applications for epoxy resins are brought out with detailed explanations and photographs in a pamphlet. These include use of the materials in foundries as well as for tooling in the aircraft and automotive industries. Applications for electrical insulating systems and effective adhesive techniques also are described in the booklet. (Ren Plastics, Inc.)

For free copy circle No. 23 on postcard

Worm Gear Drives

Illustrating and describing the complete line of enclosed worm gear drives, a catalog features simplified selection procedures and rating tables. This enables the user to make quick, accurate identification of the drive which meets a specific requirement. (Foote Bros. Gear & Machine Corp.)

For free copy circle No. 24 on postcard

Induction Motors

A colorful, illustrated brochure on induction motors covers frame sizes in the induction series; up to 400 hp in dripproof enclosures and up to 350 hp in the enclosed machines. Large photos illustrate various construction details. (Elliott Co.)

For free copy circle No. 25 on postcard

Practical Preheat

A practical method of preheat, that permits quality welds on low-alloy high-tensile steels, is outlined in an illustrated bulletin. The publication describes how underbead cracking and other weld defects can be avoided by preheat with a new "building block" electrical strip heater system. The building block system's aluminum-shoe strip heater units, with 39 pct greater heat-transfer efficiency, are described. (J. B. Nottingham & Co., Inc.)

For free copy circle No. 26 on postcard

Centrifugal Fans

All-purpose centrifugal fans are presented in a 76-page booklet. It describes the complete line of fans with flat, backwardly-inclined blading. These fans are suited for a number of applications: supply and exhaust, general building ventilation, industrial air conditioning, vehicular tunnel ventilation, and industrial processes. The descriptions of key components and features of these fans are well illustrated.

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. **6/30/60**

Circle numbers for Free Technical Literature, Design Digest, or New Equipment:

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No postage necessary if mailed in the United States

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Post Office Box 77, Village Station

NEW YORK 14, N. Y.

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Post Office Box 77, Village Station

NEW YORK 14, N. Y.

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. **6/30/60**

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Product Manufactured .....

Company .....

Co. Address .....

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City ..... Zone .... State .....

FREE LITERATURE

(Sturtevant Div. of Westinghouse Electric Corp.)

For free copy circle No. 27 on postcard

Diamond Wheels

Describing a complete line of diamond wheels, a catalog gives a complete net price supplement. Included in the catalog are detailed data on: available grit sizes and diamond concentrations; wheel markings; suggestions to prolong wheel service life; complete ordering information on both resinoid bonded and new metal bonded diamond wheels. (Manhattan Rubber Div., Raybestos - Manhattan, Inc.)

For free copy circle No. 28 on postcard

Heat-Transfer Oil

Consisting of two pages, a technical bulletin on heat-transfer oil gives complete information. It includes properties and advantages. Some of the advantages claimed for the oil include: high thermal efficiency; high thermal stability; and easy circulation. (Sun Oil Co.)

For free copy circle No. 29 on postcard

Foundry Refractories

Meeting every foundry need, a complete line of refractories is described in an eight-page brochure. Special sections are devoted to the specific types and classes of refractories used for cupolas, electric furnaces, malleable furnaces, nonferrous metal furnaces and pouring equipment. It also includes data on refractory molding media, plastic graphite refractories, high-temperature bonding mortars, insulating refractories and castable refractories. (Harbison-Walker Refractories Co.)

For free copy circle No. 30 on postcard

Barrel Finishing

An illustrated bulletin discusses various abrasive media; the type of deburring action required in specific applications; and considerations in the selection of proper abrasive materials. The four-page bulletin also discusses the use of two basic types of deburring compounds: those non-abrasive chemical blends which are used with abrasive media to prevent chemical attack and provide better cleaning action, and those in which an abrasive material is combined with the particular chemical blend. (Frederick Gumm Chemical Co.)

For free copy circle No. 31 on postcard

Limit Switch

Sixteen illustrated pages fill a bulletin to describe and show a snap-lock limit switch. This sturdy new unit is designed to meet industry's demand for high reliability. Subjects covered in the bulletin include the key design features of the limit switch, an extensive section on how it works, aided by a series of progressive colored illustrations and line drawings, switch specifications, parts lists, actuating cams, and operating levers. (The National Acme Co.)

For free copy circle No. 32 on postcard

Milling Cutters

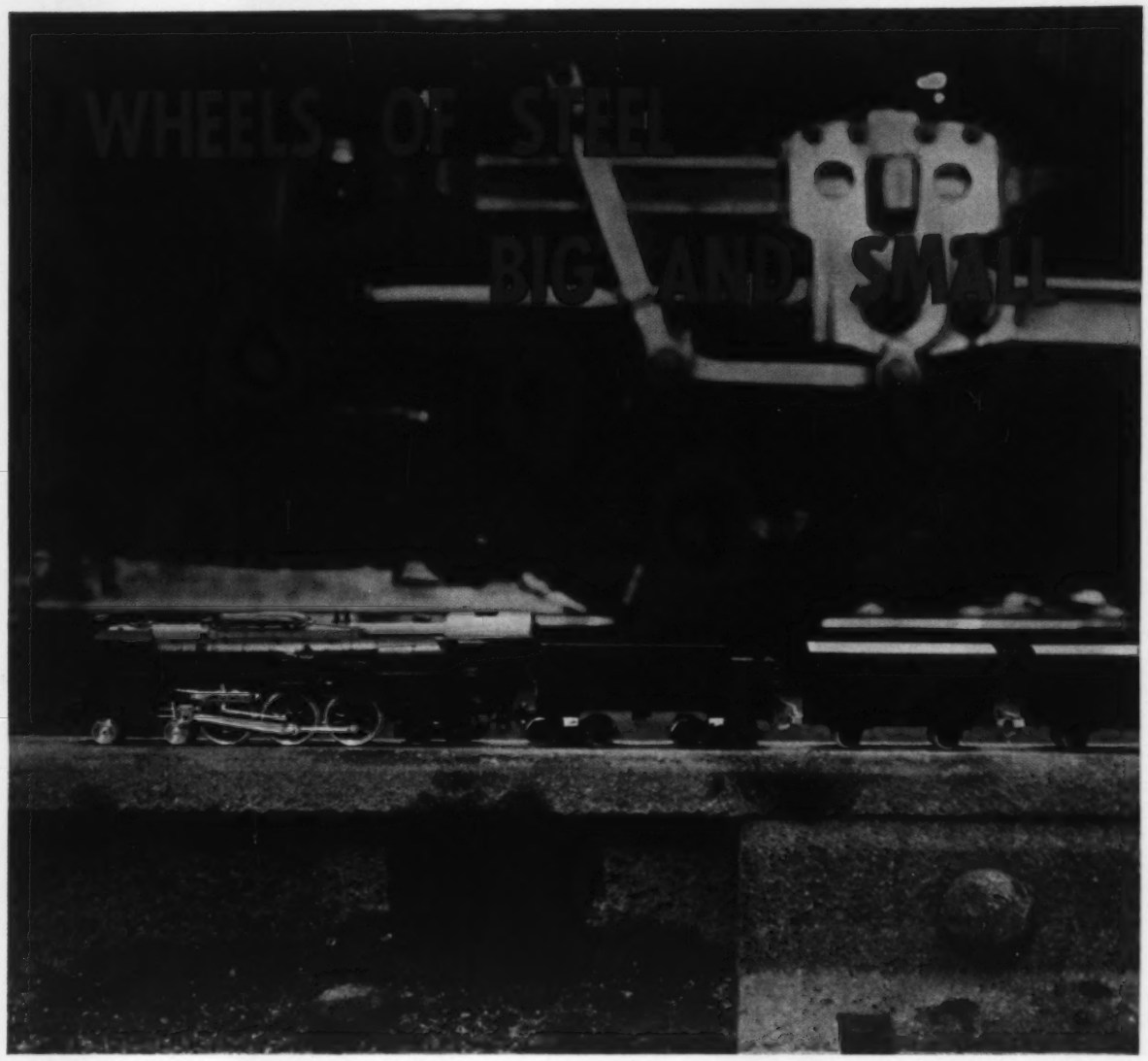
An eight-page pictorial brochure features milling cutters single and multi-point tools and accessories. It shows and describes plain mills, side mills, end mills, hollow mills, form cutters, counterbores, core drills and reamers; special multi-diameter tools, face mills, single point tools, and related products such as drive collars, special arbors, and micrometric spacers. (O. K. Tool Co., Inc.)

For free copy circle No. 33 on postcard

Air Conditioning

How to determine whether factory air conditioning will be a profitable investment is the subject of a new, easy-to-read booklet. The booklet presents four key check figures with which plant executives can qualify their operation. Two or more affirmative answers indicate that air conditioning would not only pay for itself but would return a profit on the investment. (Carrier Corp.)

For free copy circle No. 34 on postcard



Wheels keep industry going and YAWATA provides the best materials for progress.

YAWATA keeps abreast of world developments, with firm resolve to supply the best and only the best.

YAWATA IRON & STEEL CO., LTD.

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Cable Address: YAWATAISCO NEWYORK

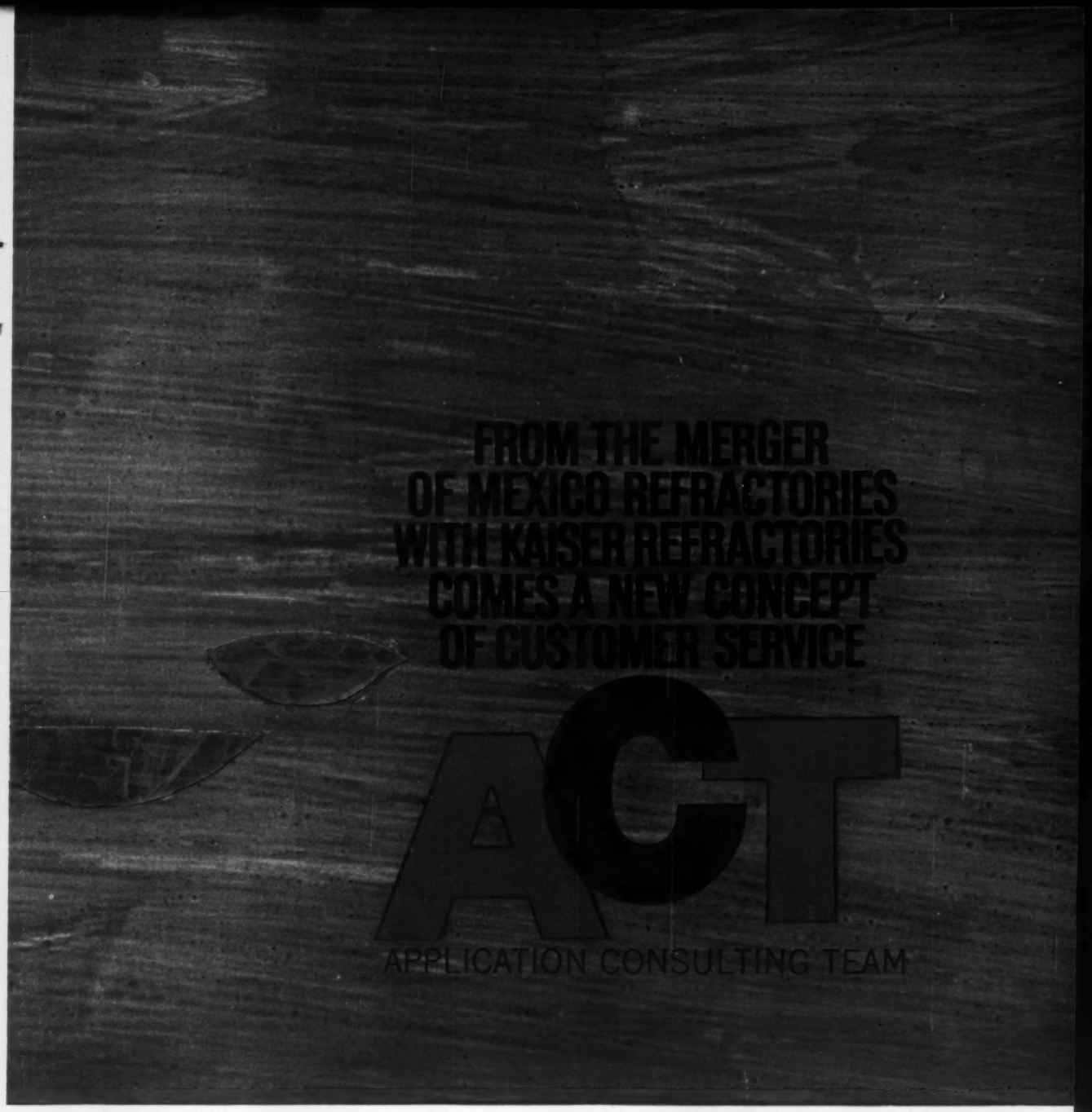
EUROPEAN OFFICE Kloster Strasse 22, Duesseldorf, West Germany
Cable Address: YAWATASTEEL DUESSELDORF

A SPECIAL KAISER REFRACTORY GROUP TO HELP YOU REDUCE REFRACTORY COSTS AND IMPROVE REFRACTORY PERFORMANCE

A C T has been created out of the merger of Mexico Refractories and Kaiser Refractories to help the steel industry profit fully from this outstanding fact: RECENT TECHNICAL DEVELOPMENTS HAVE GIVEN MODERN REFRACTORIES SUCH HIGH PERFORMANCE POTENTIALS THAT PROPER SELECTION AND USE IS NOW AS IMPORTANT TO ECONOMY AND EFFICIENCY AS THE TECHNICAL DEVELOPMENTS THEMSELVES.

We have seen this fact demonstrated again and again:

• When a steel producer was losing production time to premature taphole failure, A C T specialists helped establish a system of casting tapholes during ground rebuild. Here are the taphole performance results for the four



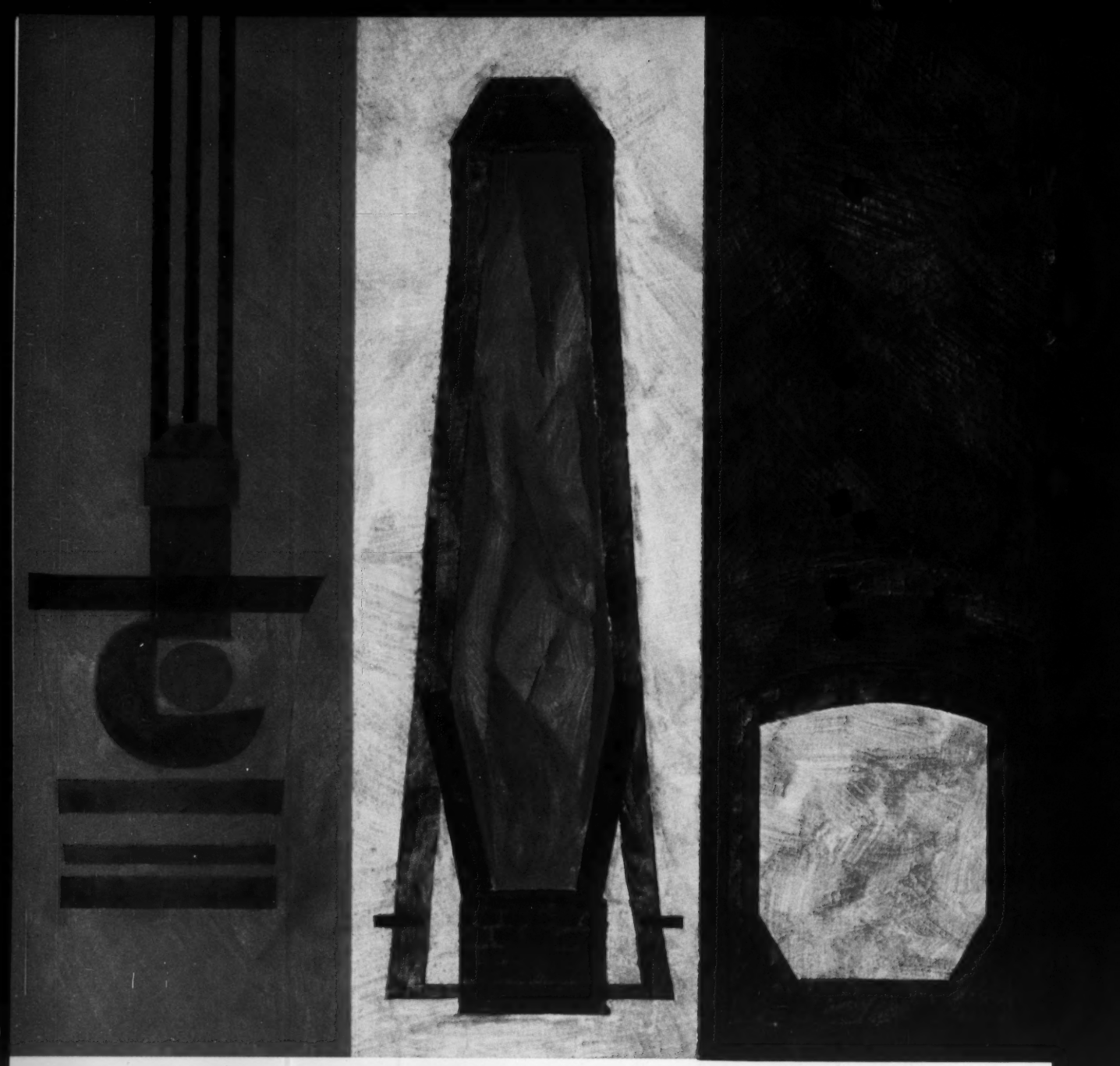
latest jobs: 125, 113 and 92 heats (250 ton furnaces), 80 heats (400 ton furnace).

• For blast furnaces that must be kept on the line to meet heavy production schedules, A C T specialists developed a technique for gunning repairs right onto the lining with K/R Blast Furnace Castable. Besides dramatic reductions in down-time, these repairs have extended campaign life up to 18 months . . . for about one-fourth the cost of brick repairs!

• To demonstrate savings through improved endwall performance, A C T teams compared furnaces using Kaiser Periclase-Chrome Brick to other furnaces in the same shops that were using other brick. Results? — longer service than any competitive brick used, with an average of 470 heats with endwalls of Kaiser Periclase Chrome Brick.

From hundreds of examples like these comes the purpose of A C T: To help you—through combined modern research facilities, expert knowledge of all types of refractory application techniques, and wide experience working with steel producers—to achieve lower refractory costs and improved refractory performance.

HERE'S HOW ACT IS ORGANIZED...



THREE GROUPS OF A C T SPECIALISTS

The A C T team is composed of three major groups of specialists within Kaiser Refractories:

1. INDUSTRY ENGINEERING GROUP These sales engineers, many with supervisory experience within customers' industries, help evaluate your refractory needs. Calling upon combined technical services, they help create a complete refractories program fitted to your particular operation.

2. APPLICATION DEVELOPMENT GROUP These specialists bring to your operation a comprehensive working knowledge of up-to-date refractory application techniques . . . including survey, assistance in selection, detail drawings and actual installation assistance. With experience in virtually every type of refractory made, they offer you one source for all refractory needs!

3. REFRACTORY RESEARCH GROUP These specialists—with a 30-year record as pioneers of major advancements in modern refractories—act in an advisory capacity to the other two groups. In addition, this fully-integrated research service offers you the newest developments from combined research in basic, fireclay, alumina and silica refractories.

HOW CAN A C T SERVE YOU?

Over 100 A C T sales engineers

throughout the country are ready now to work with you directly—whether to answer an immediate problem or to plan toward desired future improvements. Your A C T sales engineer will call upon the services of A C T specialist groups according to the nature of your requirements.

You can take immediate advantage of A C T service by writing or calling "the man on A C T" at any of the Kaiser Refractories Sales Offices listed above.

KAISER REFRACTORIES

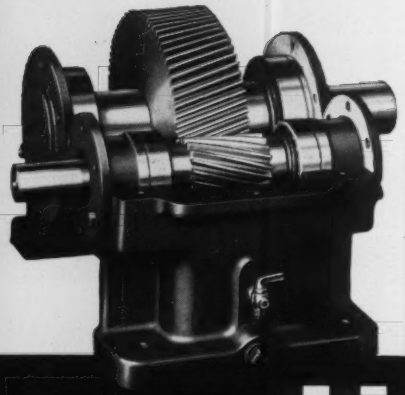
FOR FULL DETAILS, SEND FOR THIS FREE ACT BOOKLET MEX-R-CO High Alumina, Fireclay and Silica Refractories
Kaiser Periclase Brick, Mortars, Grains and Ramming Mixes

ACT, KAISER REFRACTORIES & CHEMICALS DIVISION, KAISER ALUMINUM & CHEMICAL SALES, INC.
KAISER CENTER, 300 LAKESIDE DRIVE, OAKLAND 12, CALIFORNIA

Please send me a copy of the booklet, "A C T—To Help You Reduce Refractory Costs And Improve Refractory Performance." I understand there is no obligation.

Name_____ Company_____

Address_____ City_____ State_____

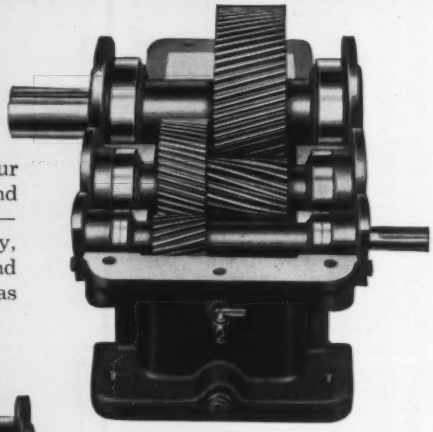


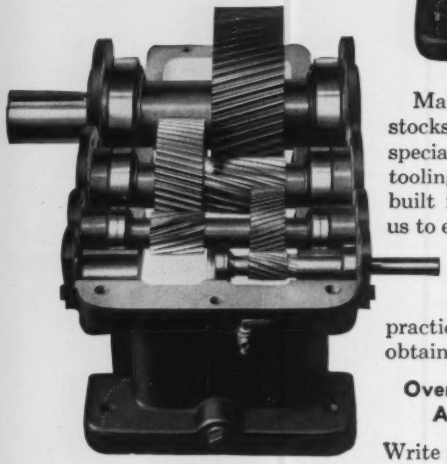
Fast Delivery on Custom Requirements

Specify **H & S**
Helical Speed Reducers
Single · Double · Triple Reduction

You get *fast action* when you come to Horsburgh & Scott with your speed reducer and gearing problems.

We are able to meet your specifications—or design and build to your specific needs—products of highest quality, backed by the experience and reputation of many years as leaders in the gearing field.





Maintaining one of the largest stocks of patterns and blanks . . . special equipment and special tooling—much of it designed and built in our own plant—enables us to engineer and produce a wide range of custom gearing and transmission requirements, economically and practically as fast as you can obtain them from stock sources.

Overall design conforms to AGMA specifications

Write for details on wide size and capacity range of H&S Speed Reducers—Helical, Herringbone, Worm Gear and combinations.

The HORSBURGH & SCOTT CO.
5112 Hamilton Avenue • Cleveland 14, Ohio

Specializing in fast production of quality Speed Reducers and Gearing to meet custom requirements.

FREE LITERATURE

Nitrogen Generator

Describing a new line of packaged nitrogen atmosphere generators, a bulletin includes typical installations, applications, features, and a comprehensive flow chart. It also includes a utilities table showing at a glance the amounts of gas, power, and water required to obtain maximum capacities. (Gas Atmospheres, Inc.)

For free copy circle No. 35 on postcard, p. 171

Maintenance Coatings

A bulletin describes high-temperature coatings for maintenance painting and industrial finishing. The bulletin provides complete descriptive information on silicone and silicone-ceramic coatings; and their use as a protection for metal exposed to heat, wet or dry to 1400°F, corrosive atmospheres and weather. (Dampney Co.)

For free copy circle No. 36 on postcard, p. 171

Gages and Valves

Detailed information is given in a four-page data unit on heated gages and valves. The gages and valves have wide application where liquids must be kept at higher than ambient temperatures for process reasons, or to hasten the speed of response to level changes. They can also be used for outside applications to prevent breakage of gages from freezing. (Jerguson Gage & Valve Co.)

For free copy circle No. 37 on postcard, p. 171

Speed Recorders

An eight-page bulletin describes and illustrates up-to-date applications of a speed recording system. More specifically, this bulletin covers the use of speed recorders in brake research, highway surface evaluation, paper processing and newspaper production. It also includes a complete description of the use of speed relays to protect belt conveyors. (The Esterline-Angus Co.)

For free copy circle No. 38 on postcard, p. 171

POSITIVE DUPLICATION—EVERY TIME!

These "fingerprints" of a tree will always duplicate characteristics by which an expert can positively identify all cross-sections from the trunk of that tree.

But you don't have to be an expert to get Positive Duplication—when you use these CINCINNATI (PD)° SEGMENTS, and *all* CINCINNATI GRINDING WHEELS.

YOU GET (PD) UNIFORMITY

Cincinnati supplies you with wheels of uniform excellence, because of the unique (PD) manufacturing process which involves 36 separate and unvarying quality controls.

Every step, from grain mix to final inspection, is directed to uniformity of product. For example, while vitrified wheels are being fired, automatic recording analyzers keep sampling the kiln atmosphere to maintain desired oxygen content throughout the firing process.

RESULT: DEPENDABLE PERFORMANCE

You can *depend* on (PD) WHEELS because each reorder wheel gives you exactly the same good job as the original.

Using (PD) WHEELS you will find production going up, and costs going down . . . *to stay!* This is the promise —and the performance—of Positive Duplication.

CALL CINCINNATI TODAY

Solve your grinding problems with the help of specialists trained by the Cincinnati Milling Machine Company. Their wide experience in job set-ups and grinding operations is at your service.

Just call your CINCINNATI (PD) GRINDING WHEELS Distributor or contact Cincinnati Milling Products Division, Cincinnati 9, Ohio.

(PD) POSITIVE DUPLICATION

CINCINNATI°

GRINDING WHEELS

°Trade Mark Reg. U.S. Pat. Off.

A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.

ANDY DANEFF PUT THE RAINBOW IN A CAN

There are wealthy men today who can credit their first million to men like Andy Daneff. Andy is an Alcoa Specialty Salesman who helped manufacturers formulate a paint for an overlooked source of profit—the fifth side of a building.

By drawing on Alcoa's vast fund of aluminum knowledge, Andy's customers were able to mix color and tiny aluminum flakes to dot the landscape with sparkling rooftops that defy the weather and please the eye.

Andy is one of some 500 Alcoa Specialty Salesmen who scored kindred accomplishments in hundreds of different industries. They helped put buy-appealing foil packages on the grocer's shelf; high-purity alumina ceramic nose cones on today's guided missiles; aluminum electrical transmission lines across the land.

Whatever you make in aluminum, Alcoa trains specialists like Andy Daneff to help you produce it, package it, promote it and sell it. This is still another way we put more than 16 ounces of metal into every pound of Alcoa® Aluminum you buy—an added value that's all yours when you call on your local Alcoa sales office. Aluminum Company of America, 2018-F Alcoa Building, Pittsburgh 19, Pa.

ALCOA ALUMINUM

helps you design it, make it, sell it

Alcoa has hundreds of Andy Daneffs to help you design it, make it, sell it

All of Alcoa's skills are mobilized to a single purpose: To put more than just 16 ounces of metal in every pound of Alcoa Aluminum you buy. Here are 12 of the dozens of ways to do it:

1. Research Leadership, bringing you the very latest in aluminum alloys and applications.

2. Product Development by specialists in your industry and your markets.

3. Process Development Labs for aid in finishing, joining and fabricating.

4. Service Inspectors to help solve production problems at your plant.

5. Quality Control to meet top standards or match your special needs.

6. Complete Line including all commercial forms, alloys, gages, tempers.

7. Availability via the nation's best stocked aluminum distributors.

8. Foremost Library of films and books to help you do more with aluminum.

9. Trained Salesmen with a wealth of on-the-spot information.

10. Sales Administrators constantly on call to service your orders.

11. Year-Round Promotions expanding your old markets, building new ones.

12. The Alcoa Label, leading symbol of quality aluminum, to mark your goods.

Added Values With Alcoa Aluminum

. . . is a case book of Alcoa special services and a guide to their availability in design, manufacture and sales. Your copy, with some of the most rewarding information you may ever read, is waiting and it's FREE. Write: Aluminum Company of America, 2018-F Alcoa Building, Pittsburgh 19, Pa.

NEW BOOKS

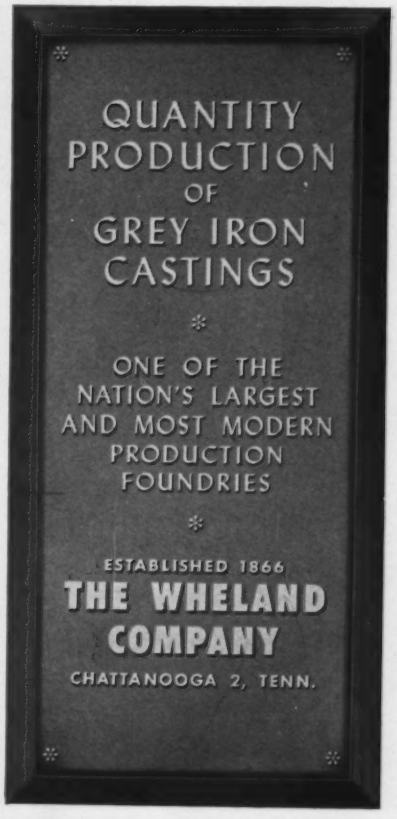
"Cathodic Protection," by J. H. Morgan, shows how the cost of cathodic protection is a very modest premium to pay for immunity, when even local corrosion can be costly, in the operational time of plant or ship. The text also covers electrochemistry, corrosion and cathodic protection, resistivity and electrode resistance, sacrificial anodes, spray current and interference corrosion, the cathodic protection of buried structures and many others. $12.00 per copy. The Macmillan Co., 60 Fifth Ave., New York 11.

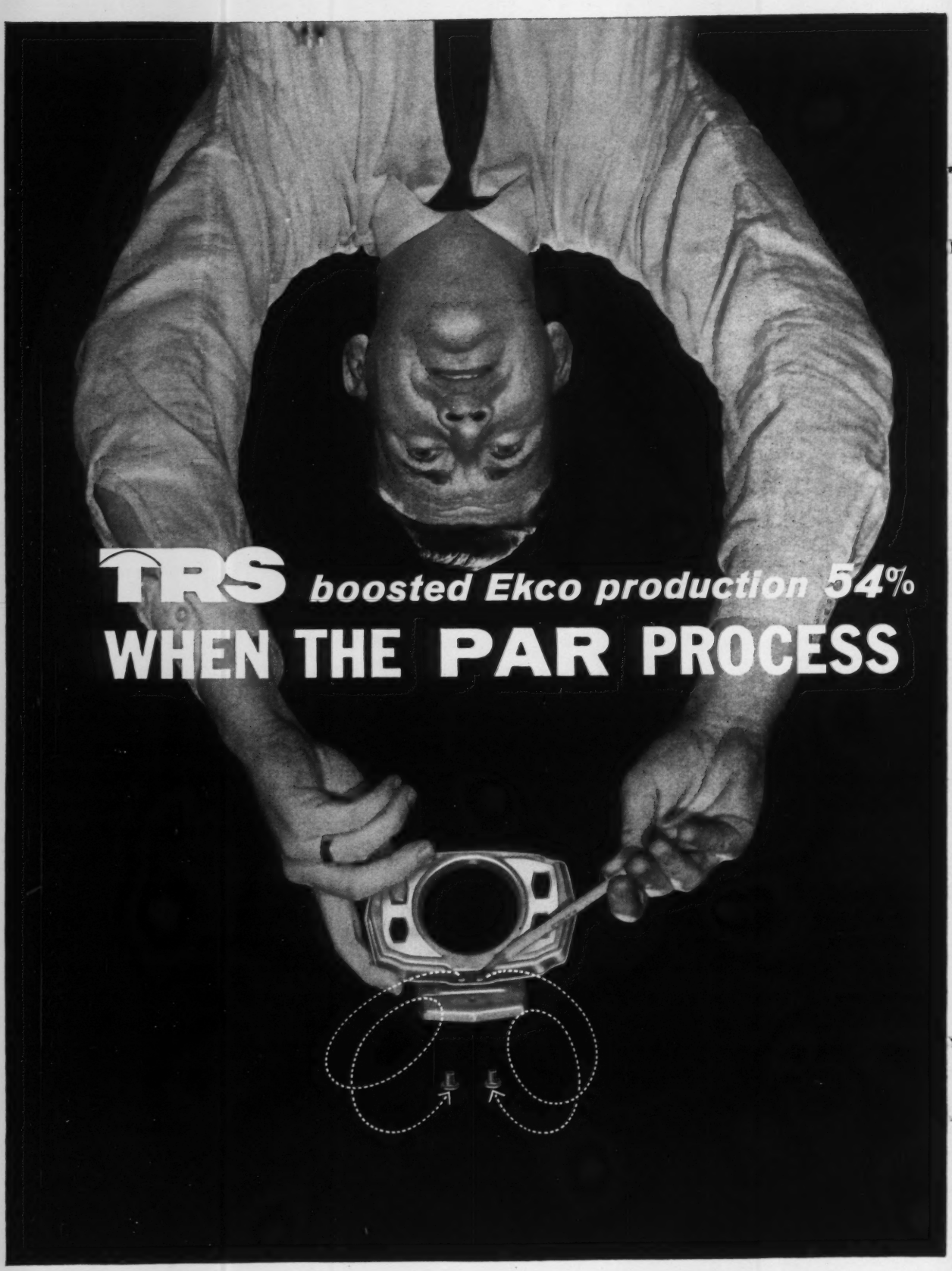
"Automated Cybernetics and Society," by F. H. George, Ph. D, summarizes the age of automation. This age will see whole fields of daily human labor revolutionized by the machine. This book gives an essential overall picture of logic, psychology, physiology, philosophy and their ramifications. It is not a text intended for specialists in any field. It is primarily aimed to clarify this important problem not only for the scientists, but for the executive and the layman. 283 pp. $12.00. Philosophical Library, Inc., 15 East 40th St., New York 16.

"Temperature Conversion Tables," by W. A. Brodhecker, is designed for speed and convenience, commensurate with accuracy. These tables of conversion from fahrenheit to centigrade are correct to three decimal places. Conversion from centigrade to fahrenheit is made by interpolation, where second or third decimal-point accuracy is required. Temperatures from —100° to 300°F are given. 84 pp. $2.75 per copy. Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C.

"The Industrial Challenge of Nuclear Energy," explains the actions taken at the Stresa Conference on industrial prospects in nuclear energy. Construction programs, for nuclear power stations during the next six years, represent an investment of some three billion dollars. The book explains the production demands that will be made on equipment and materials in the chemical, mechanical, and electronic fields. 275 pp. $3.00 per copy. O. E. E. C. Publications Office, 1346 Connecticut Ave., N. W., Washington 6, D. C.

"Industrial Building Details," by Duane F. Roycraft, is a master reference of industrial detail drawings. They are drawn to scale. This new book is designed for use as an everyday working tool. The drawings are sharp, legible, clearly labeled, and large enough to facilitate tracing or projection. Explanatory text accompanies the text whenever necessary. Every detail of the contemporary industrial building is shown, including structural details, walls, windows, louvers, roofs, and many others. A key to symbols and abbreviations, and a master index make each item in the book instantly available. The book is an invaluable reference for




TRS boosted Ekco production 54%
WHEN THE PAR PROCESS

For Ekco Products Company, attaching wall brackets to their Autoyre® soap dishes and glass holders meant hand-assembling components with solid aluminum rivets in position, then placing the assembly in a die which required two strokes to clinch the rivets. This slow process, with lots of hand work, became a serious handicap when production demand started to climb. Obviously, a better method had to be found.

Automatic riveting, with semi-tubular rivets, would offer real savings. But riveting from the front was blocked by a flange on the product, and riveting from the back left the rivet clinches visible which lessened the attractiveness of the finished product.

There the problem stuck, until the TRS engineer — applying the PAR Process — suggested a new viewpoint. Working with Ekco engineers, he proposed riveting the assembly from the back but with the rivets fed upside down, so that their heads would be visible as required for good appearance. To accomplish this, he designed a special flat head rivet which could be fed and set in this manner with a standard TRS machine.

The change jumped daily production volume by 54%, without loss of product quality or appearance values.

THE MACHINE PAR PROCESS PRESCRIBED was a standard TRS Model 103L single-drive riveter. Designed to set flat head rivets of the type used in Ekco glass holders and soap dishes, it feeds them into the riveting position resting on their heads. For Ekco, the machine was fitted with a special loading fixture to position the parts of the assembly, and an air-operated pusher to eject the finished units.

STOOD RIVETS ON THEIR HEADS

FIND OUT what the PAR Process can save you

PAR stands for **P**roduction **A**utomated **R**iveting. Its objective is cost reduction and increased production rate. It involves a careful study of the complete assembly operation by TRS engineers and your own production men . . . an organized search for opportunities to eliminate or simplify and speed-up steps in the assembly.

An invitation to conduct the PAR Process study in your plant is almost certain to bring you benefits such as those produced for many prominent manufacturers.

Benefits Like These: Often, the PAR Process has led to better integration and higher automation of the various steps in assembly and fastening. In many cases, it discloses ways to improve efficiency through minor modification of existing or standard equipment . . . or a simple change in materials or rivet design as in the case of Ekco. Sometimes, it reduces rejects and other costly elements in the assembly operations. Always, it considers not only human and equipment factors but also the important problems of using the most suitable rivet for the job.

Why is PAR a TRS Process? Because it involves procedures specially organized by TRS. It requires application by the specially trained and experienced TRS Engineers. It demands that unique advantages of TRS developments in rivets and riveting machines be available.

Ask for a check of your operations. Whether your fastening jobs are simple or complex, it can be worth dollars to you.

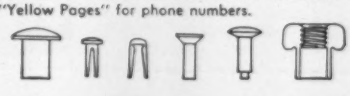
TRS

TUBULAR RIVET & STUD COMPANY

QUINCY 70, MASSACHUSETTS • TRS SALES OFFICES: Atlanta • Buffalo • Charlotte • Chicago Cleveland • Dallas • Detroit • Hartford • Indianapolis • Los Angeles • New York Philadelphia • Pittsfield • Quincy • St. Louis • Seattle. WAREHOUSE IN CHICAGO

See "Yellow Pages" for phone numbers.

If it's a Tubular Rivet TRS makes it . . . and Better



This pivot is one of the larger parts Sperry assembles and inspects with B&L StereoZoom Microscopes.

How Sperry Saves Time with StereoZoom® Microscopes

In its work on the B-58 Hustler and Jupiter C missile programs alone, the Air Armament Division of Sperry Gyroscope Company makes over 250 different detail parts of floated gyroscopes and integrating accelerometers.

The Bausch & Lomb StereoZoom Microscopes allow Sperry's operators to see this sub-miniature work enlarged in natural, 3-D detail. These instruments provide the long, unobstructed working distance (up to 7″) required for intricate assembly operations without damage to delicate parts. To check work, a turn of the zoom knob provides *any* desired magnification within the instrument's range; working distance stays the same, with work always in focus.

In critical inspection, Sperry saves scanning time by setting the dial to the exact magnification needed for specific checks, (from 3.5× through 120×). And these B&L Microscopes are light enough to be carried easily for spot checks at any assembly point. Sperry keeps its B&L StereoZoom Microscopes busy for the full working day, with complete visual comfort for the operators.

Find out how you, too, can save time in assembly and inspection with B&L StereoZoom Microscopes.

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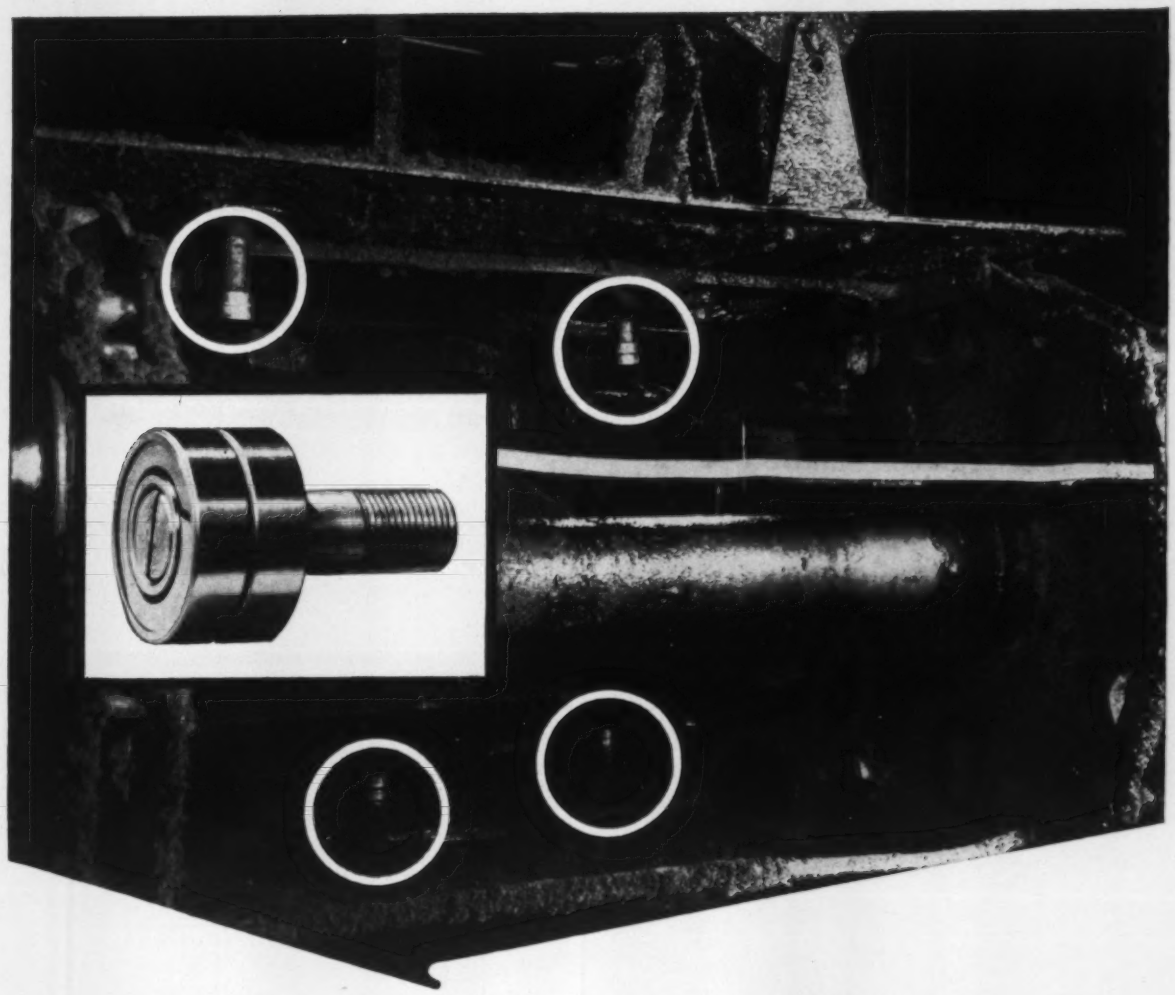
BAUSCH & LOMB
SINCE B&L 1853

engineers, architects and designers. 352 pp. $12.75 per copy. F. W. Dodge Corp., New York.

"Periodic Temperature Distribution in Laminated Solids," by R. J. Grosh, relates recent studies made on periodic heat conduction, by matrix methods adapted to numerical evaluations in developing formulae for temperature in multilayer solids. An electrical analogy of four-terminal networks is offered in support of this approach. The 29-page booklet contains illustrations and a bibliography of 37 references. 75¢ per copy. Office of Technical Services PB161292, U. S. Dept. of Commerce, Washington 25, D. C.

"Power Cost Normalization Studies, Civilian Power Reactor Program-1959," by The U. S. Atomic Energy Commission, includes 164 pages of text, tables, and graphs and 102 pages of engineering drawings. The material is related to cost estimates for eight power-reactor concepts. The subjects covered include: scope of work in connection with the cost studies; basic evaluation parameters used in preparing the studies; capitol cost breakdowns and summaries for pressurized water, organic cooled, sodium graphite, fast sodium cooled, thermal aqueous homogeneous, heavy water, and gas cooled reactor plants; and many other topics of interest. $2.50 per copy. Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C.

"The International Electrotechnical Commission Publication 72-1," is a new international standard recommendation for the dimensions and output ratings of electric motors. The publication is concerned with foot-mounted ac induction motors with shaft heights between 2⅝ and 12½ in., for voltages up to 600 v and for frequencies of 50 and 60 cps. It includes tables of standard dimensions, shaft extensions, and output ratings for these motors. $2.40 per copy. American Standards Assn., 10 East 40th Street, New York 16.



When thrust loads overpowered original bearings... Bearings, Inc. had the answer!

The original bearings on this automatic machine failed after a short time because they weren't designed to take the thrust loads to which they were subjected. Bearings, Inc. engineers designed and had built a special stud on which were mounted two permanently lubricated and sealed ball bearings.

To keep the cost of this design to a minimum "Locktite", a permanent bonding agent, was used to hold the bearings to the stud. This eliminated shoulders, locknuts or rings yet the bond is as strong as the best press fit.

This installation has now been in operation for many months with no failures reported.

This is not an isolated example of our services — surveys of bearing requirements, inventory control, application engineering, maintenance schedules and procedures are a regular and continuing part of our service to all customers to whom we supply replacement bearings.

Tell us how we can help YOU!

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Providing bearing service in the North →

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and

in the South →

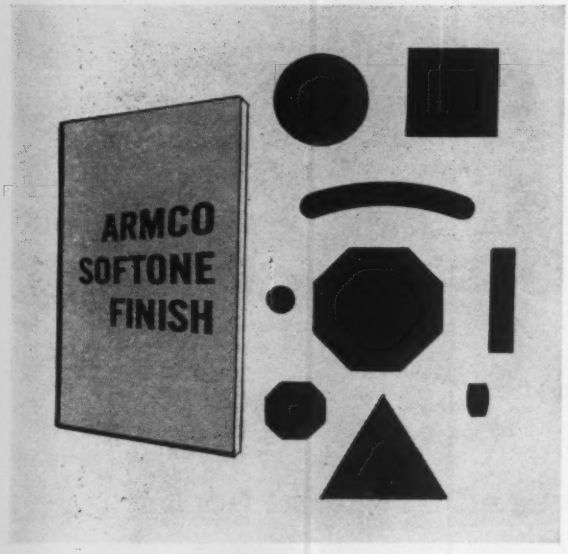
DIXIE BEARINGS, INC.

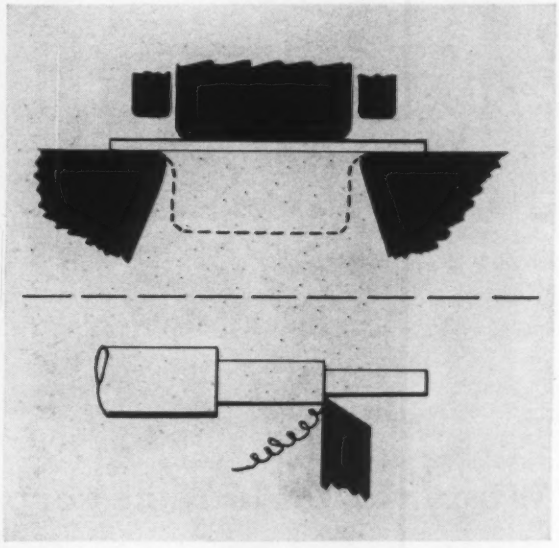
ARKANSAS: Little Rock • **FLORIDA:** Jacksonville • **GEORGIA:** Atlanta • **KENTUCKY:** Louisville • **LOUISIANA:** Baton Rouge New Orleans • **N. CAROLINA:** Charlotte • Greensboro • **S. CAROLINA:** Greenville • **TENNESSEE:** Chattanooga • Kingsport • Knoxville Memphis • Nashville • **VIRGINIA:** Norfolk • Richmond • Roanoke

ARMCO STEELS for better products • lower costs

WHY ARMCO STAINLESS MEET DESIGN NEEDS AT

Armco Stainless Steels enable you to design to your specific needs at least cost because they are available not only in all the standard types but in many special grades as well. You can select an Armco Stainless Steel with the most economical durability; with fabricating properties suited to your design and shop equipment; with special mill finishes, machinability, and heat treatment that cut production costs.





Maximum Economy

Where corrosion problems are not severe, Armco Stainless such as Types 405, 410, 420 and 430 provide necessary durability at minimum cost. Special Armco surface finishes on sheet and strip can eliminate some finishing operations. A wide range of standard and special bar and wire shapes also makes it possible to cut costs by reducing machining operations.

Fabrication Simplified

Armco produces many variations of the standard stainless types to facilitate fabrication and cut production costs. They include 11 free-machining grades, at least one for each basic type of stainless. In addition, Armco Type 304, 304 ELC and 316 ELC simplify production of welded stainless equipment. Grades such as Armco Type 305 plus special Armco processing facilitate drawing and forming.

In designing and manufacturing parts of your products that must be durable, beautiful or strong, you can profit with the specific advantages of Armco Stainless Steels. Write us, describing your requirements, or fill out and mail the coupon. Armco Steel Corporation, 1740 Curtis Street, Middletown, Ohio.

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Send me information on Armco Stainless Steels recommended for the following service:_____

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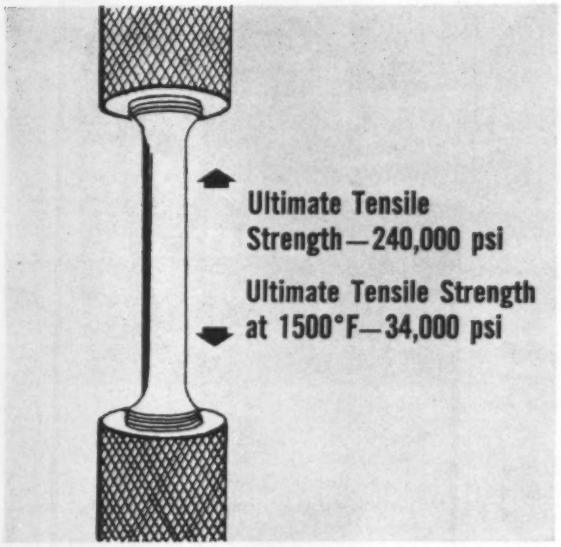
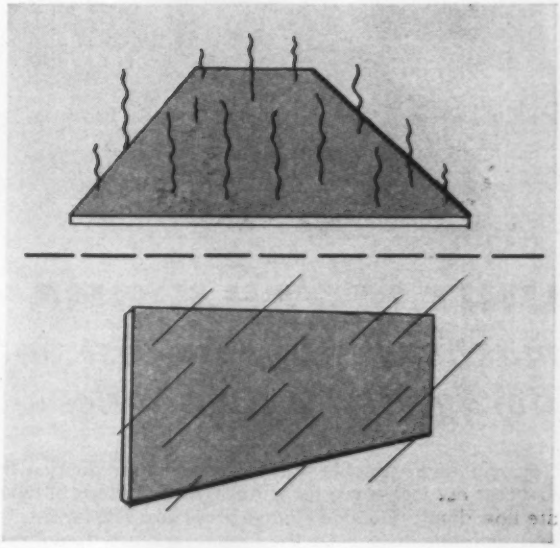
New steels are born at Armco





Unique Properties

Armco has developed many special stainless steels with unusual combinations of properties to meet specific demands for better materials. Typical examples are Armco 17-14 Cu Mo with high temperature strength and oxidation resistance; Armco 17-4 PH, 17-7 PH and PH 15-7 Mo with ultra-high strength and hardness plus good corrosion resistance and excellent fabricating properties; and Armco 17-10 P, a high strength grade that is non-magnetic.

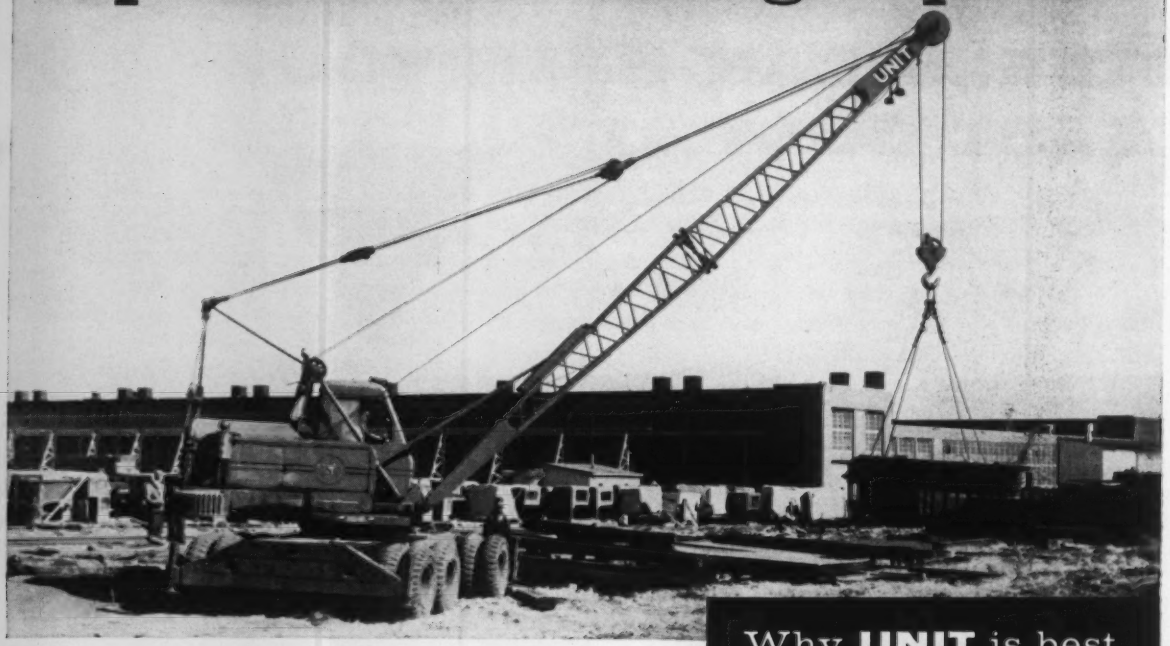
Maximum Durability

Where service conditions are severe, Armco's standard or special stainless steels offer the possibility of maximum durability at lowest over-all cost. About 25 different grades of Armco Stainless Steels are available for applications that require superior resistance to oxidation or severely corrosive media in combination with high strength at room and elevated temperatures.

ARMCO STEEL

Armco Division • Sheffield Division • The National Supply Company • Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Union Wire Rope Corporation

Squeezed for Storage Space?



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You can save valuable *indoor* space for production by utilizing low cost *outdoor* space for storage, as thousands of modern plants are now doing. Outside storage areas cost far, far less to construct and maintain than even the lowest cost new buildings.

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Check your plant today and see if "roofless warehousing" isn't the answer to some of your production bottle-necks. And check UNIT also to see why it offers the most machine for your investment — then call your nearby UNIT Dealer. He'll be happy to survey your operations and suggest the UNIT that's engineered to your needs.

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Why **UNIT** is best for "roofless warehousing"

- **TIMESAVING MOBILITY** with self-propelled UNIT Mobile Cranes that travel fast — lift high — reach far — extending your "warehouse" limits . . . horizontally and vertically.
- **MORE MANEUVERABILITY** with a short turning radius, full revolving, compact machinery arrangement. Assures low overhead clearance and minimum width.
- **SAFETY CAB**—Full Vision cab provides safe, wide-angle visibility for operator in every direction, brings your "stock-picker" the comfort and efficiency of working indoors.
- **DISC TYPE CLUTCHES** and ventilated, oversize brakes insure smooth, safe, accurate handling of loads without "grabbing".
- **WIDE CHOICE OF MODELS** — 11 machines from which to choose . . . including truck and crawler cranes . . . from 10 to 40 ton capacities. Most models are convertible to various front end attachments for greater versatility.

The Iron Age Summary

The Summer Slump? It's Here

Shutdowns spread as seasonal factors aggravate a dull market. And, there are signs that the fall upturn may not be anything to brag about. But a few plus factors provide reasons to hope.

■ Positive signs of a major steel pickup in August are hard to find. The big steel users, other than automotive, are not talking about a major reversal in their buying policies.

And unless these traditionally important steel consumers come in with big orders, the late summer upturn isn't going to come close to boom size.

Positive Thinking — However these signs point the way to an upturn in late summer:

Automotive companies are beginning to place orders that indicate a buildup of auto production to a high point in October.

Inventory cutbacks have to end eventually.

The summer vacations and other seasonal factors have dropped steel ordering to an abnormal low. The end of vacations will automatically mean a brisker rate of steel orders.

Lethargic Customers — Working against these factors is the lethargy of big steel consumers. Their failure to support the market is the principal reason for the present low state of steel operations.

Unfortunately, there is little reason to expect a significant change in their ordering. Here's why:

Steel warehouses are loaded with inventory and sales are not good.

The railroads are not scheduling any big car building programs. In fact, freight car orders are low and backlogs fast dwindling.

The appliance industry has high stocks of steel and very high inventories of finished products in dealer and distributor hands.

The oil country goods market is feeble and no recovery is in sight. Shipments of tubular products have been running only about 8 to 10 pct of the steel total. Traditionally, they run about 12 pct.

Construction has not picked up as expected and there is little reason to expect any reversal in building.

All At Once—Against the pessimistic outlook, the positive factors of automotive orders, inventory buildup and end of seasonal declines should come at almost the same time. If this happens, the steel market can make a fast recovery.

In addition, if retail buying holds up or increases, steel operations can come back relatively strong.

Shutdowns — Heading into the July 4 weekend, the shutdown wave for steel is shaping up as one of the worst in recent years. The operating rate will drop about 7 points this week and another slide is expected next week.

U. S. Steel has turned off steelmaking furnaces at Edgar Thompson Works. Already down are Clairton Works, the Donora Works of American Steel and Wire, the McKeesport plant of National Tube. In Youngstown, U. S. Steel will shut down furnaces for a week. Jones & Laughlin facilities in Detroit are down. This is only part of the list. A number of mills have not announced holiday plans.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	1,560	1,739	1,726	2,215
Ingot Index				
(1947-1949=100)	97.1	108.3	107.4	137.9
Operating Rates				
North East Coast	61.0	69.0	64.0	77.0
Buffalo	56.0	61.0*	69.0	84.0
Pittsburgh	48.0	59.0	61.0	77.0
Youngstown	42.0	46.0*	27.0	72.0
Cleveland	59.0	64.0	64.0	54.0
Detroit	82.0	80.0	81.0	84.0
Chicago	54.0	63.0	68.0	86.0
Cincinnati	50.0	54.0*	60.0	72.0
St. Louis	61.0	68.0*	77.0	104.0
South	62.0	63.0	54.0	82.0
West	63.0	63.0	63.0	81.0
U. S. Rate	54.8	61.0	60.6	78.2

*Revised

Source: American Iron And Steel Institute

Prices At a Glance

(Cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.41	$66.41	$66.41	$66.41
Scrap No. 1 hvy (Gross ton)	$31.00	$31.00	$32.50	$38.17
No. 2 bundles	$20.83	$20.83	$21.83	$25.50
Nonferrous				
Aluminum ingot	28.10	28.10	28.10	26.80
Copper, electrolytic	33.00	33.00	33.00	31.50
Lead, St. Louis	11.80	11.80	11.80	11.80
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	101.75	101.50	101.25	103.50
Zinc, E. St. Louis	13.00	13.00	13.00	11.00

Motor Market Holds Steady

Motor makers say the market is steady, but orders are not near to taxing capacity.

Makers of small motors are hardest hit by market trends, and face a critical year.

■ Makers of electric motors report a market that is steady but not strong enough to tax capacity.

All types of motors are in ready supply. Suppliers face tight competition in matters of price and service. No one is looking for an upturn great enough to upset the buyers market.

Disappointment—For large motors, one manufacturer calls business "satisfactory" so far this year. However, orders from steel mills have been disappointing. And the overall market is in a state of flux.

"Things are changing from hour to hour," says a sales executive. "Purchasing is frantic—buyers are waiting till the last minute before moving."

To get orders, builders are having to offer fast delivery. Standard motors up to 1000 hp are available in 6 to 10 weeks. Delivery is less critical on the biggest units, which are built on a project basis and are custom designed.

Keen Competition—Price competition continues strong with each order a matter of negotiation. There is still the potential for a good year. A lot of projects are in the works. But there is definite hesitation on the part of buyers. Steel mills, in particular, are holding back.

In the design of large motors, there seems to be a trend toward more outdoor units. In steel mill application, rectifiers are attracting interest as substitutes for motor generators. Two or three recent rectifier installations are being watched carefully by the industry. On new projects, more proposals include rectifier control.

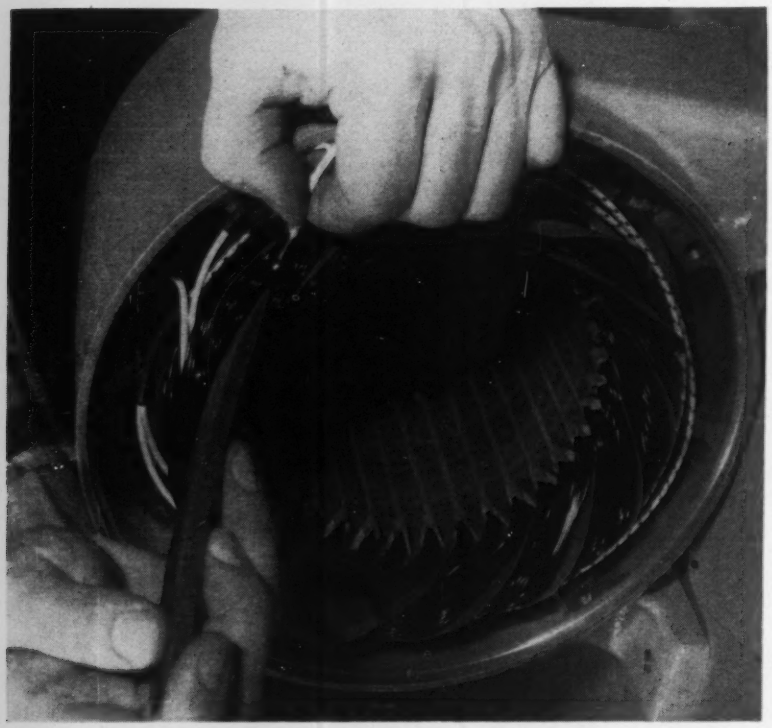
A Little Better—Integral horsepower motors are doing "somewhat better than in 1959." Until recently, suppliers were looking for a significant upturn. Now there is less certainty about the future. There is little prospect that demand will come close to straining capacity.

With ample supply, there is tough competition on price, performance and service. Large stocks of standard motors are available for immediate delivery. Motors requiring minor modification are available in one to two weeks. For special designs, delivery can be a matter of months.

Almost Finished—Re-rating programs of integral horsepower motors are largely complete. The normal ratings have been developed according to new standards. Builders are now cleaning up fringe models.

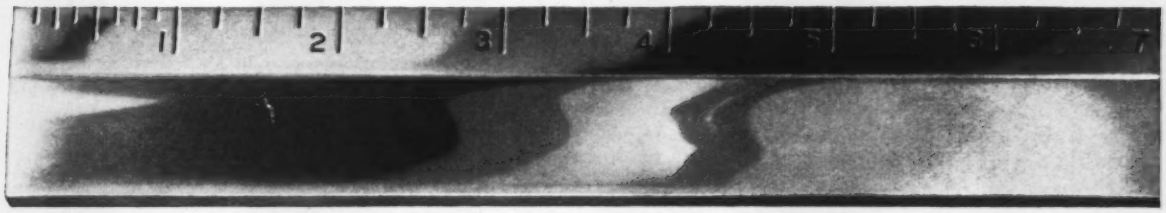
The next round of remodeling is still in the thinking stage. However, new insulating materials are constantly being developed. Suppliers expect the trend to more compact design to continue. Motors in the future will be smaller and probably run a little hotter.

Fractional horsepower motors are feeling the effects of the appliance lag. With a high degree of automation and with capacity far in excess of demand, small motor makers face some of the toughest problems in the electrical industry.



SAFE OPERATION: Westinghouse temperature-coefficient thermisters provide positive motor protection. They sense heat buildups in windings.

There's just One Rule at Bristol Brass...



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Tradition Fails Pipe Producers

Tubular products have failed to take their traditional share of the steel market.

Producers put the blame on a combination of factors hitting at the same time.

■ So far, this has been a far from satisfactory year for pipe producers. Just about every market has broken the wrong way at just about the same time.

The lag in heavy construction has cut into consumption of standard pipe. At the same time, standard pipe has been among the products hardest hit by imports.

Drilling Rate Drop—Oil country seamless has been hit by the fall off in domestic drilling from last year's disappointing rate. And oil producers and oil country jobbers are operating with little or no inventory. Overnight delivery from downriver depots to drilling fields is just about guaranteed.

Seamless and linepipe are being hurt by the growth in foreign capacity. Canada, for example, now has an annual electric weld capacity of about 1 million tons.

Predict Slight Upturn — In the first four months of the year shipments of tubular products accounted for only 8 to 10 pct of total steel shipments. Traditionally, these products make up 12 pct of the total.

Producers expect some improvement in pipe orders before the end of the summer. "We expect an upturn around August," says one mill executive. "The question is, how much of an upturn?"

This particular mill looks for no more than a 5 to 10 pct rise in orders. However, even with this gain mills still would be scraping the bottom.

Delivery Promises at a Glance

	East	Pittsburgh	Cleveland	Detroit	Chicago	West Coast
CR Carbon Sheet	3–5 wks	2–6 wks	3–5 wks	4–6 wks	1–3 wks	4–5 wks
HR Carbon Sheet	2–4 wks	2–4 wks	2–4 wks	2–4 wks	1–2 wks	3–4 wks
CR Carbon Strip	3–5 wks	4–6 wks	3–5 wks	4–6 wks	1–3 wks	4–5 wks
HR Carbon Strip	2–4 wks	2–4 wks	2–4 wks	2–4 wks	1–2 wks	4 wks
HR Carbon Bars	2–4 wks	1–4 wks	2–4 wks	1–4 wks	Stock–2 wks	4 wks
CF Carbon Bars	2–4 wks	2–3 wks	2–3 wks	Stock–6 wks	Stock–4 wks	1–2 wks
Heavy Plate	2–4 wks	1–2 wks			1–3 wks	4 wks
Light Plate	2–3 wks	1–2 wks	2–4 wks		1–2 wks	4 wks
Merchant Wire	Stock	Stock	1–3 wks		Stock	2 wks
Oil Country Goods	Stock	Stock	Stock		Stock	
Linepipe	Stock	1–4 wks	Stock		2–4 wks	4–8 wks
Buttweld Pipe	Stock	Stock	2–4 wks	Stock	Stock–2 wks	Stock
Std. Structurals	2–4 wks	1–2 wks	3–5 wks	1–6 wks	1–3 wks	2–4 wks
CR Stainless Sheet	Stock–4 wks	Stock–4 wks	Stock–6 wks	Stock–6 wks		
CR Stainless Strip	Stock–4 wks	Stock–4 wks	Stock–6 wks	Stock–6 wks		

Sheet and Strip—Delivery promises held steady or eased a week in every market except **Detroit.** With a flow of automotive orders for 1961 model production, flat-rolled products have moved out 1 to 2 weeks. Mills are warning smaller customers to get orders in soon or face the possibility of delays later when automotive tonnage starts to move. Although delivery times haven't been extended, **Pittsburgh** sheet producers say this product is the market bright spot. July order volume is down, but at least one mill in the district operated at about 80 pct of capacity in June.

Galvanized Sheets—Shipments of galvanized steel sheets during the first quarter set a new record of 942,096 net tons, reports the Committee on Galvanized Steel Sheet Research. This was an 8 pct increase over the 1959 period, which also set a record. Shipments to the automotive industry rose by 13 pct to a record high of 57,472 tons. This compares with 50,961 tons in the first quarter of 1959, and 22,922 in the same 1958 quarter. A 7 pct rise in shipments was made to producers of contractors products, the largest single consuming group. These shipments totaled 337,698 tons. However, **East Coast** mills are now offering tonnage in the **Midwest.** And some producers in **Chicago** are operating at around 50 pct of capacity.

Bars — No improvement in orders has been reported for bar mills. For the most part, customers are avoiding future commitments. **Pittsburgh** mills say a few orders have been received for August, but most of the incoming business is for July. Cold-finished bar orders, which had been holding up fairly well in **Chicago,** have eased.

Pig Iron—Mystic Iron Works, a subsidiary of Eastern Gas and Fuel Associates, is officially going out of the pig iron business as of July 1. Once a leading producer of pig iron in **New England,** Mystic actually closed down its furnaces at Everett, Mass., last October.

COMPARISON OF PRICES

(Effective June 28, 1960)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	June 28 1960	June 21 1960	May 31 1960	June 30 1959
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.10	14.10	14.10	13.55
Stain'l's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$10.60	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchants bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	45.00
Wrought iron bars	14.90	14.90	14.90	14.90
Wires: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 100 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	June 28 1960	June 21 1960	May 31 1960	June 30 1959
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.57	$70.57	$70.57	$70.57
Foundry, South Cin'ti	73.87	73.87	73.87	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.07	70.07	70.07	70.07
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb‡	11.00	11.00	11.00	12.25
Pig Iron Composite: (per gross ton)				
Pig iron	$66.41	$66.41	$66.41	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$30.50	$30.50	$33.50	$43.50
No. 1 steel, Phila. area	33.50	33.50	34.50	37.50
No. 1 steel, Chicago	29.00	29.00	29.50	34.50
No. 1 bundles, Detroit	27.50	27.50	27.50	36.50
Low phos., Youngstown	33.50*	34.50	35.50	43.50
No. 1 mach'y cast, Pittsburgh	49.50	49.50	49.50	51.50
No. 1 mach'y cast, Phila.	51.50	51.50	51.50	49.50
No. 1 mach'y cast, Chicago	45.50	45.50	49.50	58.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$31.00	$31.00	$32.50	$38.50
No. 2 bundles	20.83	20.83	21.83	26.33
Coke Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	$14.75-15.50	$14.50-14.75	$14.50-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	33.00	33.00	33.00	31.50
Copper, Lake, Conn.	33.00	33.00	33.00	31.50
Tin, Straits, N. Y.	101.75*	101.50	101.25	103.50
Zinc, East St. Louis	13.00	13.00	13.00	11.00
Lead, St. Louis	11.80	11.80	11.80	11.80
Aluminum, virgin ingot	28.10	28.10	28.10	26.80
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composites

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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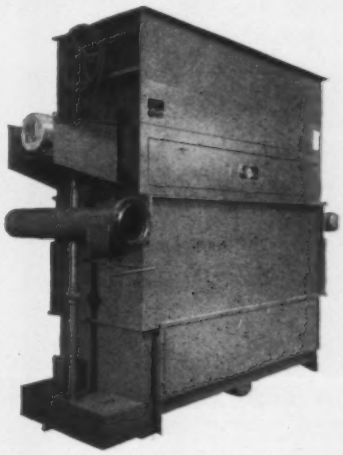

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NIAGARA BLOWER COMPANY

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Niagara District Engineers in Principal Cities of U. S. and Canada

Prices Ease Further In Dull Market

Motor blocks and chemical borings lead in spotty declines. No. 1 dealer bundles show more signs of weakness. Detroit lists are hit by model year closedowns.

Exports hold strength but Mexico wants to pay less.

A scattering of price declines characterize the continued weak scrap market.

In New York and Philadelphia this week, clean cast chemical borings dropped $2. And No. 1 dealer bundles slipped $1 lower at Philadelphia to $34 to $35, and fell off the same amount at Buffalo to $29 to $30.

St. Louis reports price dips in six grades, while Birmingham shows softer prices in eight.

Markets generally are quiet. Trading is near a standstill and many prices are on an appraisal basis.

Exports Show Strength—Exports continue to show some strength in coastal cities with ample scrap to fill the orders. East Coast reports say British, Italian and Japanese third quarter buying plans look strong. Export business is expected to hold its own but not expand in the third quarter.

In Houston, exporters report that Mexico is offering $3 a ton less on scrap. But the export business remains firm there with two ships picking up cargoes.

Auto Shutdowns—Detroit is going through its annual model closedowns, and industrial list tonnage there may run 25 pct below June.

Pittsburgh—Another slug of prompt industrial scrap is hitting the market. Tonnage is down but mill demand has dropped to almost nothing. Holiday shutdowns have been announced by two mills. Another mill is holding up shipments for an indefinite period. In this situation, prices of industrial grades hinge on the willingness of brokers to speculate.

Chicago—Scrap prices hung on what appeared to be rock bottom this week as at least three mills made purchases at previously established price levels. At the same time, dealer activity continued very weak. Attempts to buy No. 1 heavy melting at $29 met with considerable opposition, though additional low tonnage sales were made at this price.

Philadelphia—The only life reported in this market is in export. Third quarter reports on foreign buying show sustained levels by British, Italian, and Japanese are expected. Clean cast chemical borings dropped $2 to $23 to $24.

New York—There is no change in the state of this market. Export continues to be the prop. Most dealers now say they have enough business to keep busy through this summer.

Detroit—With auto plants starting model year closedowns in July, industrial list tonnage may run 25 pct below June. Final lists won't be in until June 30. Indications are prices could be down $1 to $4 from June. Biggest drops may come in bundles, followed by bushelings and turnings. Cast grades continue weak, and stainless shows no signs of picking up. Mills aren't buying and are not expected to show much interest in July.

Cleveland—Early auto lists are off about $1.50 a ton from a month ago and are probably being held that high by speculative strength. Auto lists are heavy this month at about 22,000 tons in Cleveland area. This will be more than enough to satisfy the market and further depress the market for dealer grades. There are some reports auto lists may be exported.

St. Louis—The slow demand in this area has caused the easing of some scrap prices. Trading is near a standstill and most prices are on an appraisal basis.

Cincinnati—Prices are off $1 on most prime grades as slow production is cutting the market to almost nil. Only token purchases are expected for July. And upriver demand is very low. Rails are off about $3 on very weak demand.

Birmingham—Due to upcoming vacations, the scrap market was at a standstill this week with no new buying. Only old orders being filled. Brokers dropped their appraisal basis prices on some items but said they expected only limited buying during the next 30 days. The export market is also very quiet.

Buffalo — Softness continues to plague the market here. There has been no activity. On the basis of general weakness, prices of all items except No. 2 grades and all cast grades are lower.

Boston—As the vacation season sets in, everything is quiet. Very little is doing here all this month.

West Coast—One major mill is closing down for three weeks in July. Other mills are operating at reduced schedules. Exporting continues active.

Houston—The cast market has weakened with prices dropping $2 and $1 a gross ton on unstripped motors and cupola cast, respectively. Export is holding up with two ships picking up cargoes here. Exporters report Mexico is offering $3 less a ton on scrap.

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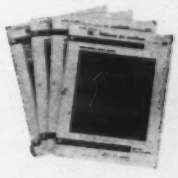

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SCRAP PRICES *(Effective June 28, 1960)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	31.00 to 32.00
No. 1 factory bundles	35.00 to 36.00
No. 2 bundles	24.00 to 25.00
No. 1 busheling	30.00 to 31.00
Machine shop turn.	13.00 to 14.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	17.00 to 18.00
Low phos. punch'gs plate	38.00 to 39.00
Heavy turnings	27.00 to 28.00
No. 1 RR hvy. melting	35.00 to 36.00
Scrap rails, random lgth.	47.00 to 48.00
Rails 2 ft. and under	52.00 to 53.00
RR specialties	46.00 to 47.00
No. 1 machinery cast.	49.00 to 50.00
Cupola cast.	42.00 to 43.00
Heavy breakable cast.	40.00 to 41.00
Stainless	
18-8 bundles and solids	195.00 to 200.00
18-8 turnings	95.00 to 100.00
430 bundles and solids	105.00 to 110.00
410 turnings	60.00 to 65.00

Chicago

No. 1 hvy. melting	$28.00 to $30.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	28.00 to 30.00
No. 1 factory bundles	34.00 to 35.00
No. 2 bundles	18.00 to 19.00
No. 1 busheling	29.00 to 30.00
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	15.00 to 16.00
Shoveling turnings	15.00 to 16.00
Cast iron borings	15.00 to 16.00
Low phos. forge crops	40.00 to 41.00
Low phos. punch'gs plate, ¼ in. and heavier	34.00 to 35.00
Low phos. 2 ft. and under	32.00 to 33.00
No. 1 RR hvy. melting	33.00 to 34.00
Scrap rails, random lgth.	41.00 to 42.00
Rerolling rails	49.00 to 50.00
Rails 2 ft. and under	48.00 to 49.00
Angles and splice bars	41.00 to 42.00
RR steel car axles	47.00 to 48.00
RR couplers and knuckles	38.00 to 39.00
No. 1 machinery cast.	45.00 to 46.00
Cupola cast.	40.00 to 41.00
Cast iron wheels	31.00 to 32.00
Malleable	43.00 to 44.00
Stove plate	34.00 to 35.00
Steel car wheels	37.00 to 38.00
Stainless	
18-8 bundles and solids	175.00 to 180.00
18-8 turnings	85.00 to 90.00
430 bundles and solids	85.00 to 90.00
430 turnings	40.00 to 50.00

Philadelphia Area

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy melting	29.00 to 30.00
No. 1 dealer bundles	34.00 to 35.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	35.00 to 36.00
Machine shop turn.	14.00 to 15.00
Mixed bor. short turn.	14.00 to 15.00
Cast iron borings	14.00 to 15.00
Shoveling turnings	20.00 to 21.00
Clean cast. chem. borings	23.00 to 24.00
Low phos. 5 ft and under	37.00 to 38.00
Low phos. 2 ft punch'gs	39.00 to 40.00
Elec. furnace bundles	36.00 to 37.00
Heavy turnings	27.00 to 28.00
RR specialties	39.00 to 40.00
Rails, 18 in. and under	56.00 to 57.00
Cupola cast.	40.00 to 41.00
Heavy breakable cast.	39.00 to 40.00
Cast iron car wheels	42.00 to 43.00
Malleable	50.00 to 51.00
No. 1 machinery cast.	51.00 to 52.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$25.50 to $26.50
No. 2 hvy. melting	21.00 to 22.00
No. 1 dealer bundles	25.50 to 26.50
No. 2 bundles	17.00 to 18.00
Machine shop turn.	10.00 to 11.00
Shoveling turnings	12.00 to 13.00
Cast iron borings	11.00 to 12.00
Low phos. 18 in. and under	33.00 to 34.00
Rails, random length	42.00 to 43.00
Rails, 18 in. and under	50.00 to 51.00
No. 1 cupola cast.	35.00 to 36.00
Hvy. breakable cast.	32.00 to 33.00
Drop broken cast.	47.00 to 48.00

Youngstown

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	21.00 to 22.00
Machine shop turn.	16.00 to 17.00
Shoveling turnings	19.00 to 20.00
Low phos. plate	33.00 to 34.00

Cleveland

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	22.00 to 23.00
No. 1 dealer bundles	29.00 to 30.00
No. 1 factory bundles	32.50 to 33.50
No. 2 bundles	18.00 to 19.00
No. 1 busheling	29.00 to 30.00
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Cut structural & plates, 2 ft & under	35.00 to 36.00
Drop forge flashings	29.00 to 30.00
Low phos. punch'gs plate	30.00 to 31.00
Foundry steel, 2 ft & under	34.00 to 35.00
No. 1 RR hvy. melting	33.00 to 34.00
Rails 2 ft and under	49.00 to 50.00
Rails 18 in. and under	50.00 to 51.00
Steel axle turnings	24.00 to 25.00
Railroad cast.	47.00 to 48.00
No. 1 machinery cast.	50.00 to 51.00
Stove plate	39.00 to 40.00
Malleable	47.00 to 48.00
Stainless	
18-8 bundles	190.00 to 195.00
18-8 turnings	85.00 to 90.00
430 bundles	90.00 to 95.00

Buffalo

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 busheling	29.00 to 30.00
No. 1 dealer bundles	29.00 to 30.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	12.00 to 13.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	14.00 to 15.00
Low phos. plate	39.00 to 40.00
Structurals and plate, 2 ft and under	39.00 to 40.00
Scrap rails, random lgth.	37.00 to 38.00
Rails 2 ft and under	47.00 to 48.00
No. 1 machinery cast.	46.00 to 47.00
No. 1 cupola cast.	42.00 to 43.00

St. Louis

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	27.00 to 28.00
Foundry steel, 2 ft	30.00 to 31.00
No. 1 dealer bundles	32.00 to 33.00
No. 2 bundles	18.00 to 19.00
Machine shop turn.	8.00 to 9.00
Shoveling turnings	10.00 to 11.00
Cast iron borings	18.00 to 19.00
No. 1 RR hvy. melting	31.00 to 32.00
Rails, random lengths	35.00 to 36.00
Rails, 18 in. and under	39.00 to 40.00
RR specialties	38.00 to 39.00
Cupola cast.	42.00 to 43.00
Heavy breakable cast.	33.00 to 34.00
Stove plate	35.50 to 36.50
Cast iron car wheels	35.00 to 36.00
Rerolling rails	47.00 to 48.00
Unstripped motor blocks	36.00 to 37.00

Birmingham

No. 1 hvy. melting	$28.00 to $29.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 dealer bundles	28.00 to 29.00
No. 2 bundles	16.00 to 17.00
No. 1 busheling	31.00 to 32.00
Machine shop turn.	18.00 to 19.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	9.00 to 10.00
Electric furnace bundles	32.00 to 33.00
Elec. furnace, 3 ft & under	31.00 to 32.00
Bar crops and plate	36.00 to 37.00
Structural and plate, 2 ft.	35.00 to 36.00
No. 1 RR hvy. melting	28.00 to 29.00
Scrap rails, random lgth.	40.00 to 41.00
Rails, 18 in. and under	45.00 to 46.00
Angles and splice bars	39.00 to 40.00
No. 1 cupola cast.	46.00 to 47.00
Stove plate	46.00 to 47.00
Cast iron car wheels	38.00 to 39.00
Unstripped motor blocks	36.00 to 37.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	21.00 to 22.00
No. 2 dealer bundles	16.00 to 17.00
Machine shop turnings	7.00 to 8.00
Mixed bor. and turn.	9.00 to 10.00
Shoveling turnings	10.00 to 11.00
Clean cast. chem. borings	18.00 to 19.00
No. 1 machinery cast.	38.00 to 39.00
Mixed yard cast.	35.00 to 36.00
Heavy breakable cast.	33.00 to 34.00
Stainless	
18-8 prepared solids	170.00 to 175.00
18-8 turnings	80.00 to 85.00
430 prepared solids	70.00 to 75.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$24.00 to $25.00
No. 2 hvy. melting	15.00 to 16.00
No. 1 dealer bundles	27.00 to 28.00
No. 2 bundles	15.00 to 16.00
No. 1 busheling	24.00 to 25.00
Drop forge flashings	24.00 to 25.00
Machine shop turn.	8.00 to 9.00
Mixed bor. and turn.	11.00 to 12.00
Shoveling turnings	11.00 to 12.00
Cast iron borings	11.00 to 12.00
Heavy breakable cast.	29.00 to 30.00
Mixed cupola cast.	33.00 to 34.00
Automotive cast.	42.00 to 43.00
Stainless	
18-8 bundles and solids	170.00 to 175.00
18-8 turnings	60.00 to 65.00
430 bundles and solids	60.00 to 65.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$24.00 to $24.50
No. 2 hvy. melting	20.00 to 21.00
No. 1 dealer bundles	24.00 to 24.50
No. 2 bundles	14.00 to 15.00
No. 1 busheling	24.00 to 24.50
Machine shop turn.	5.00 to 6.00
Shoveling turnings	6.50 to 7.50
Clean cast. chem. borings	13.00 to 14.00
No. 1 machinery cast.	38.00 to 39.00
Mixed cupola cast.	32.00 to 33.00
Heavy breakable cast.	27.00 to 28.00

San Francisco

No. 1 hvy. melting	$34.00
No. 2 hvy. melting	30.00
No. 1 dealer bundles	30.00
No. 2 bundles	20.00
Machine shop turn.	$14.00 to 15.00
Cast iron borings	14.00 to 15.00
No. 1 cupola cast.	46.00

Los Angeles

No. 1 hvy. melting	$32.00
No. 2 hvy. melting	29.00
No. 1 dealer bundles	27.00
No. 2 bundles	17.00
Machine shop turn.	15.00
Shoveling turnings	15.00
Cast iron borings	$15.00 to 16.00
Elec. furnace 1 ft and under (foundry)	42.00 to 43.00
No. 1 cupola cast.	42.00

Seattle

No. 1 hvy. melting	$35.00
No. 2 hvy. melting	33.00
No. 2 bundles	22.00
No. 1 cupola cast.	36.00
Mixed yard cast.	36.00

Hamilton, Ont.

Brokers buying prices per net ton on cars:

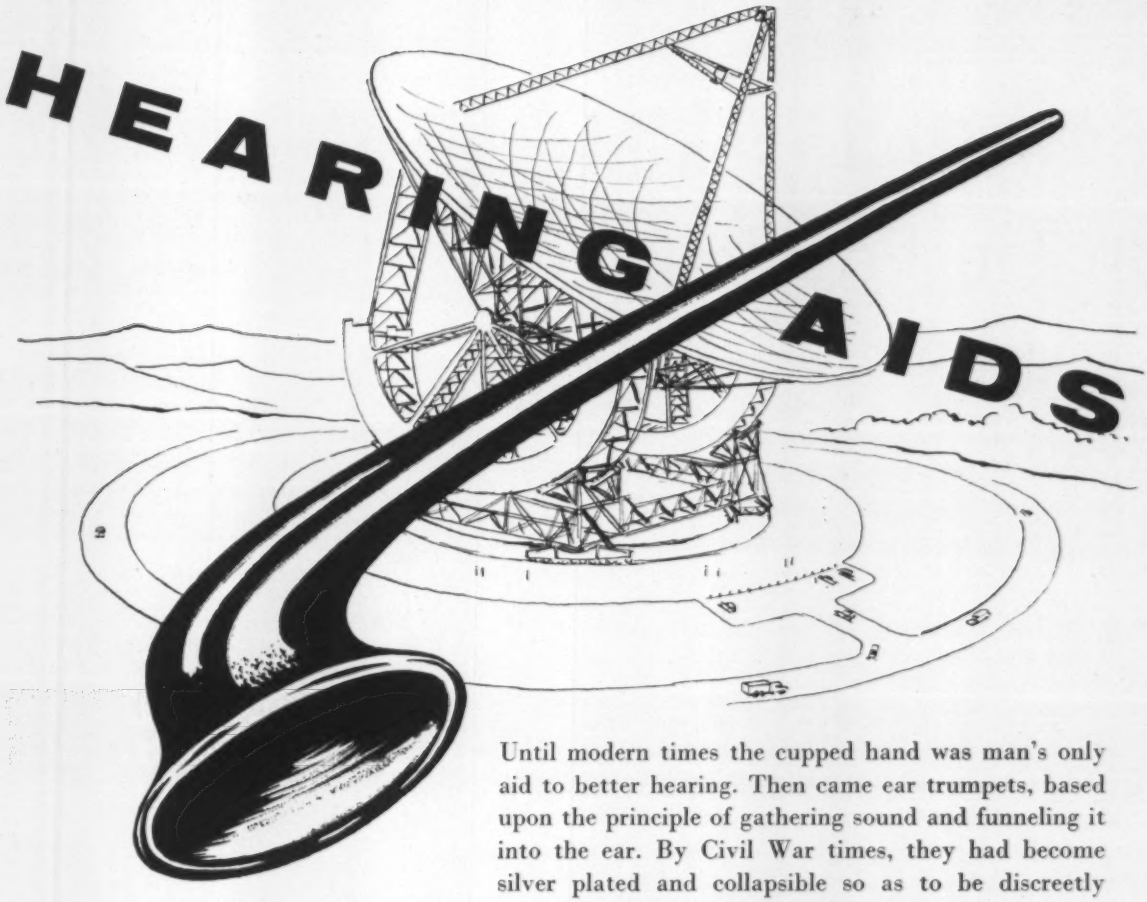
No. 1 hvy. melting	$25.80
No. 2 hvy. melting, 2 ft. and under	25.50
No. 1 dealer bundles	25.80
No. 2 bundles	19.00
Mixed steel scrap	16.00
Bush., new fact., prep'd	25.50
Bush., new fact., unprep'd	20.45
Machine shop turn.	12.00
Short steel turn.	12.00
Mixed bor. and turn	12.00
Cast scrap	33.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$34.00
No. 2 hvy. melting	31.00
No. 2 bundles	19.00
Machine shop turn.	12.00
Shoveling turnings	14.00
Cut structural plate 2 ft & under	$40.00 to 41.00
Unstripped motor blocks	26.00 to 27.00
Cupola cast.	32.00 to 33.00
Heavy breakable cast.	25.00 to 26.00

HEARING AIDS



Until modern times the cupped hand was man's only aid to better hearing. Then came ear trumpets, based upon the principle of gathering sound and funneling it into the ear. By Civil War times, they had become silver plated and collapsible so as to be discreetly carried in a handbag. To aid the physician's hearing, the stethescope was invented around 1819 by Rene Laennec. Alexander Graham Bell's telephone, patented in 1876, was the result of experimentation with electrical conduction of sound for the deaf.

Today's hearing aids range from button-size transistor sets to the Navy's 600-ft. diameter radio telescope from which scientists will tune in on radio signals emitted by astral bodies as far as 38 billion light years out in space.

For hearing aids weighing ounces, or several thousand tons—and for numberless other modern-day needs—an adequate supply of steel must be continuously available—and scrap is an indispensable ingredient.

For the purchase

or sale of

iron or steel scrap

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1960—OUR 50th YEAR

Few Changes Made In Tin Pact

Only a few mutterings are heard after approval of new International Tin Agreement.

Ratification is likely, although some delegates express reservations.

■ A new International Tin Agreement was approved last week by the United Nations Tin Conference. After approval by the individual nations, it will replace the existing document when it expires June 30, 1961.

Fifteen acceptances, including 9 consuming nations, are needed for ratification.

Outwardly, and to all practical purposes, the Conference was a success. Actually, there is little change in the agreement.

Export Controls—For example, export controls, a subject of heated debate, remain almost unchanged. The International Tin Council will still have the power to set the level of exports in any quarter or "control period" when the Council decides it is necessary to maintain stable prices and markets.

The major difference is distribution. Countries' quotas will depend on their normal share of the world market. The only loser is Bolivia.

Currently, Bolivia is alloted 19.40 pct of the total market in control quarters. In the new agreement, Bolivia will be assigned 18 pct. All of the other producers gained some part of what Bolivia lost.

Malaya, as before, is the dominant producer, improving from 37.75 pct to 38 pct.

Voting Rights—Votes in the Tin Council are apportioned on the same basis, adding up to 1000. Bolivia lost some of its influence on future action of the Council as well.

Some delegates indicated that the major change in the new agreement is not in black and white. The producers' main objection to export controls was that they were being applied too readily. The word is that consuming members have agreed that export controls will be applied only after all other avenues of approach have all been tried.

Price Ceilings Unchanged—Floor and ceiling prices, at which the manager of the buffer or reserve stock must buy and sell to stabilize markets, are unchanged. But the delegates gave the impression that this isssue was merely postponed. This is likely to be the subject of some heated discussion at a future session of the Council.

The Bolivian delegate particularly called for stabilization of world prices at a higher level to help less efficient producers.

New Members—The power of the United Kingdom in the International Tin Council was diluted with the net addition of three prospective new consuming members.

The agreement calls for a total of 1000 votes for consumers and 1000 for producers, based on their relative importance in world tin markets. When new members are added, the 1000 votes are reapportioned.

Under the new agreement U.K. will have 238 votes. Now it has 401.

A Compromise — No one was claiming victory in the new agreement. All called it a compromise.

The Malayan delegate said both sides made major concessions.

The Indonesian delegate said he was disappointed that his "high expectations" at the beginning of the conference had not been realized. The Indonesians may be unhappy about their share of the slice taken from Bolivia, as well as the unchanged export control section.

The Japanese delegate admitted he had been somewhat difficult in some of the closed sessions, but said his government would at least cooperate with the ITC, even if it did not ratify the new agreement. He implied some dissatisfaction with concessions made to producers.

Britain Favorable — Only the delegation from United Kingdom indicated that what had transpired was "broadly acceptable" to its government, and indicated that ratification looked certain. This led some observers to suggest that the consumers fared better than had been expected.

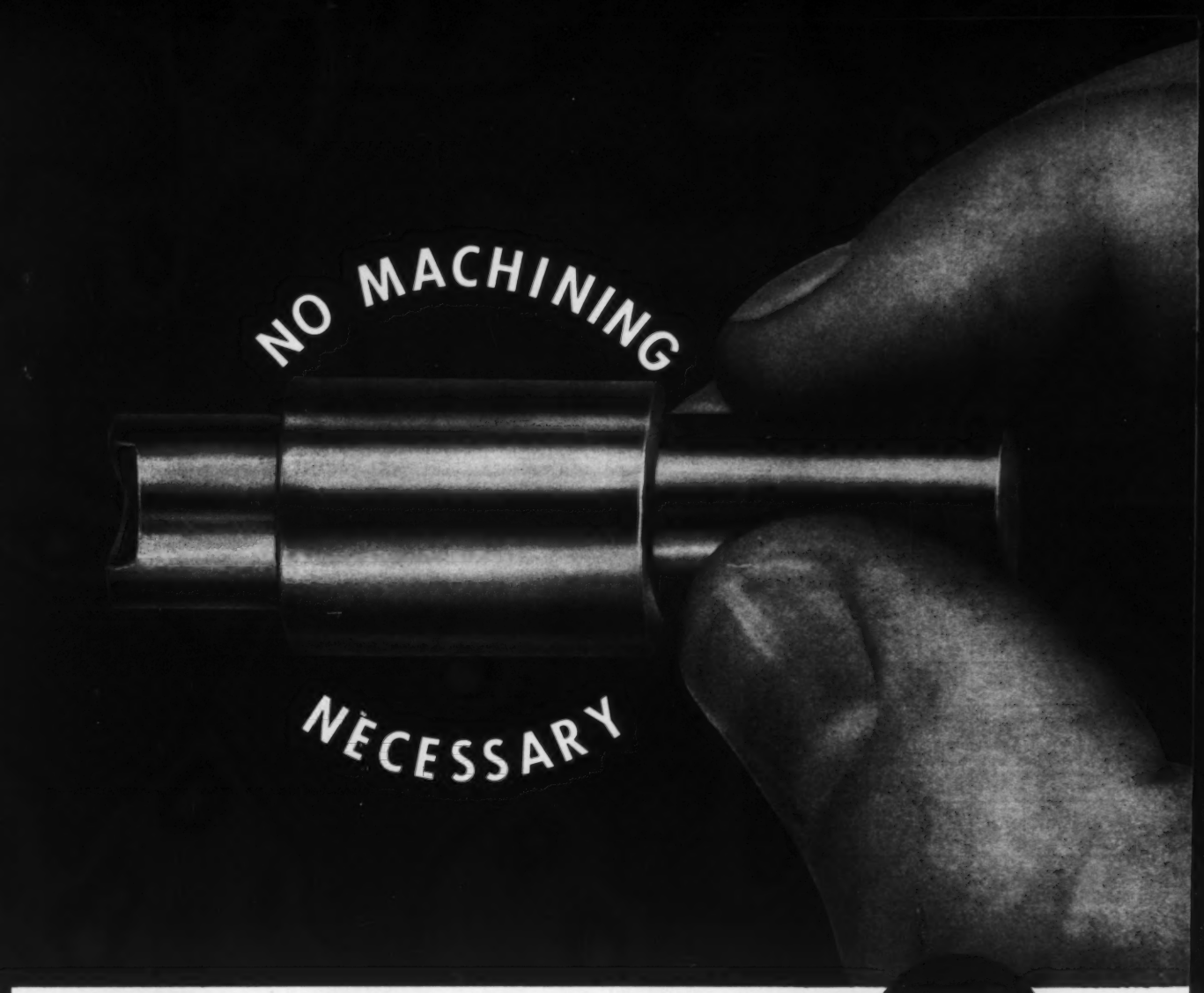
Tin prices for the week. June 22—101.75; June 23—101.625; June 24—101.625; June 27—101.75; June 28—101.75.*

*Estimates.

Primary Prices

(cents per lb)	current price	last price	date of change
Aluminum pig	26.00	24.70	12/17/59
Aluminum ingot	28.10	26.80	12/17/59
Copper (E)	33.00	30-33	11/12/59
Copper (CS)	33.00	35.00	3/11/60
Copper (L)	33.00	31.50	11/6/59
Lead, St. L.	11.80	12.30	12/21/59
Lead, N. Y.	12.00	12.50	12/21/59
Magnesium ingot	36.00	34.50	8/13/58
Magnesium pig	35.25	33.75	8/13/58
Nickel	74.00	64.50	12/8/58
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	13.00	12.58	1/8/60
Zinc, N. Y.	13.50	13.00	1/8/60

ALUMINUM: 99% Ingot COPPER: (E) = electrolytic, (CS) = cutom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. TIN: See above; Other primary prices, pg. 155.



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NONFERROUS PRICES

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.038	.048-.061	.077-.096	.136-.250
1100, 3003	47.8	47.3	46.2	45.1
5052	54.2	53.0	50.8	49.2
6061-0	51.0	49.8	47.9	46.0

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	44.7-46.2	53.2-60.8
18-32	45.2-46.8	57.7-79.9
33-38	48.8-51.4	83.3-94.5
39-44	58.7-62.4	99.9-121.0

Screw Machine Stock—2011-T-3

Size"	¼	⅜-⅝	¾-1	1¼-1½
Price	62.0	61.2	59.7	57.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.411	$1.884	$2.353	$2.823
.024 gage	1.762	2.349	2.937	3.524

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	96.9	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting)..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	138	120	138
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	130	110	126
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	57.13	.....	54.86	58.32
Brass, Yellow	50.57	50.86	50.26	54.23
Brass, Low	53.53	53.82	53.22	57.09
Brass, R L	54.58	54.87	54.27	58.14
Brass, Naval	55.12	.....	48.68	58.78
Munts Metal	53.20	.....	48.26	.....
Comm. Bs.	56.17	56.46	55.86	59.48
Mang. Bs.	58.86	.....	52.21	.....
Phos. Bs. 5%	77.44	.....	78.19	.....

Free Cutting Brass Rod..... 36.06

TITANIUM

(Base prices f.o.b. mill)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17.00. Plate, HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; Bar, HR or forged, commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 29.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be $65.00
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots .....$ 2.25
Cadmium, del'd .....$ 1.50
Calcium, 99.9% small lots .....$ 4.55
Chromium, 99.8% metallic base....$ 1.31
Cobalt, 97-99% (per lb).....$1.50 to $1.57
Germanium, per gm, f.o.b. Miami, Okla., refined .....29.95 to 36.95
Gold, U. S. Treas., per troy oz.....$35.00
Indium, 99.9%, dollars per troy oz.. $2.25
Iridium, dollars per troy oz.....$75 to $85
Lithium, 98% .....$9.00 to $12.00
Magnesium sticks, 10,000 lb. 57.00
Mercury, dollars per 76-lb flask f.o.b. New York .....$210 to $212
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz..$24 to $26
Platinum, dollars per troy oz...$82 to $85
Rhodium .....$137 to $140
Silver ingots (¢ per troy oz.).....91.375
Thorium, per kg. $43.00
Vanadium .....$ 3.65
Zirconium sponge .....$ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
- No. 115 ..... 29.25
- No. 120 ..... 28.25
- No. 123 ..... 27.25

80-10-10 ingot
- No. 305 ..... 33.75
- No. 315 ..... 31.50

88-10-2 ingot
- No. 210 ..... 42.00
- No. 215 ..... 38.75
- No. 245 ..... 34.00

Yellow ingot
- No. 405 ..... 23.75

Manganese bronze
- No. 421 ..... 28.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
- 0.30 copper max. 25.75-26.00
- 0.60 copper max. 25.50-25.75

Piston alloys (No. 132 type)..28.00-29.00
No. 12 alum. (No. 2 grade)...24.75-25.25
108 alloy 25.25-25.75
195 alloy 27.75-28.75
13 alloy (0.60 copper max.)...25.75-26.00
AXS-679 (1 pct zinc) 25.00-26.00

(Effective June 28, 1960)

Steel deoxidizing aluminum notch bar granulated or shot

Grade 1—95-97½% 25.25-26.25
Grade 2—92-95% 24.00-25.00
Grade 3—90-92% 23.00-24.00
Grade 4—85-90% 22.50-23.50

SCRAP METAL

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	29	28¼
Yellow brass	22¼	20¼
Red brass	25¾	25
Comm. bronze	26½	26
Mang. bronze	20¾	20
Free cutting rod ends.	21¼	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 26½
- No. 2 copper wire 24½
- Light copper 22⅛
- *Refinery brass 22½
- Copper bearing material 21½

*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 26¾
- No. 2 copper wire 24
- Light copper 21¾
- No. 1 composition 20½
- No. 1 comp. turnings 20
- Hvy. yellow brass solids 15
- Brass pipe 14
- Radiators 16

Aluminum

- Mixed old cast. ..... 13½—14
- Mixed new clips ..... 15 —15½
- Mixed turnings, dry ..... 14 —14½

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

- No. 1 copper wire ..... 22¾—23
- No. 2 copper wire ..... 20½—21
- Light copper ..... 18½—19
- Auto radiators (unsweated).. 12½—13
- No. 1 composition ..... 17 —17⅛
- No. 1 composition turnings... 15½—16
- Cocks and faucets ..... 13 —13½
- Clean heavy yellow brass ... 11¾—12¼
- Brass pipe ..... 13½—14
- New soft brass clippings .... 14 —14½
- No. 1 brass rod turnings .... 11½—12

Aluminum

- Alum. pistons and struts .... 7½— 8
- Aluminum crankcase ..... 11¼—11⅜
- 1100 (2s) aluminum clippings 15 —15½
- Old sheet and utensils ..... 11¼—11⅜
- Borings and turnings ..... 7 — 7½
- Industrial castings ..... 11¼—11⅜
- 2020 (24S) clippings ..... 12½—13

Zinc

- New zinc clippings ..... 7 — 7¼
- Old zinc ..... 4½— 5
- Zinc routings ..... 3¼— 3½
- Old die cast scrap ..... 2¾— 3

Nickel and Monel

- Pure nickel clippings 52-54
- Clean nickel turnings 40
- Nickel anodes 52-54
- Nickel rod ends 52-54
- New Monel clippings 28-29
- Clean Monel turnings 20-23
- Old sheet Monel 24-26
- Nickel silver clippings, mixed 18
- Nickel silver turnings, mixed 15

Lead

- Soft scrap lead ..... 8 — 8¼
- Battery plates (dry) ..... 3 — 3¼
- Batteries, acid free ..... 2 — 2¼

Miscellaneous

- Block tin ..... 75 —76
- No. 1 pewter ..... 55 —56
- Auto babbitt ..... 39 —40
- Mixed common babbitt ..... 9¾—10¼
- Solder joints ..... 13¼—13¾
- Siphon tops 41
- Small foundry type ..... 9¾—10¼
- Monotype ..... 9¾—10¼
- Lino. and stereotype ..... 8¾— 9
- Electrotype ..... 7½— 7¾
- Hand picked type shells .... 5¼— 5¾
- Lino. and stereo. dross ..... 2¼— 2¾
- Electro dross ..... 2¼— 2¾

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3,*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				15.90 *T8*
	New Castle, Pa.									7.425* *M8*				
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*		5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3, T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1,T8, M8* 7.525* *M8*	7.575 *W8*		8.40 *W8, S9,13*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	15.60 *N7*
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1,P11*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*					5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3,B4* 7.525 *E3*			8.40 *S9*	15.55 *S9* 15.60 *N7*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*			6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

* Electro-galvanized-plus galvanizing extras.

(Effective June 28, 1960)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled 18 ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* 1.25-lb. base box	Electro** 0.25-lb. base box	Holloware Enameling 29 ga.
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price, 0.75 lb. 0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb. 0.25 lb. add 65¢.		
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*			$10.50 *U1*	$9.20 *U1*	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*	6.775 *B3*		7.525 *B3*	9.275 *B3*	10.025 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	
	Worcester, Mass.									6.70 *A5*			
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*						
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3*	6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1, Y1*	7.85 *U1, Y1*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	7.95 *G2*
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*			7.225 *E2*							
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1**, *R3*	7.525 *R3, S1*	9.275 *R3,*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Donora, Aliquippa, McKeesport, Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.025 *U1, J3*	6.40 *A5, J3, P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	7.85 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	7.85 *W5*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*	7.50 *J3**	6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2, R3*	$10.50 *T2*	$9.20 *T2*	
	Houston, Texas									6.65 *S2*			

* Electrogalvanized sheets.

(Effective June 28, 1960)

*7.425 at Sharon-Niles is 7.225

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr'a. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *C4*		7.50 *C4*	7.95 *C4*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Harrisburg, Pa.							5.30 *P2*	6.375 *P2*			
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Fairless, Pa.	5.825 *U1*	5.825 *U1*		6.875 *U1*							
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7,A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3, T5*	9.025 *R3,R2, T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875*L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,13*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Plymouth, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8,B5* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5,P8* 9.225 *B5,P3*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*	5.675 *U1,I3, Y1*	7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, I1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*					5.30 *N4*				8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.30 *W5*				
	Youngstown, Ohio	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, B5*	7.775 *B2*	11.00 *P14, B5*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*	6.425 *B2,A10*				9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga.	5.875 *A8*	5.25 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective June 28, 1960) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C4 Claymont Products Dept., Claymont, Del.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co.,
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Steel Corp., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

STEEL SERVICE CENTER PRICES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery‡ Charge	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
		Hot-Rolled (18 ga. & hvr.)	Cold-Rolled (15 gage)	Galvanized (10 gage)††	Hot-Rolled		Standard Structural	Hot-Rolled (merchant)	Cold-Finished	Hot-Rolled 4615 As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4140 Annealed
Atlanta		9.37	10.61	11.83	10.85	9.73	9.94	9.53	13.24				
Baltimore**	$.10	8.37	9.71	10.16	10.78	8.94	9.63	9.15	11.90	17.48	16.48	21.58	20.83
Birmingham**		8.46	10.20	10.69	9.45	8.41	8.47	8.26	13.14	16.76			
Boston**	.10	9.84	10.68	11.87	12.26	9.72	10.26	9.87	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	8.95	10.10	11.30	10.80	9.15	9.80	9.15	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	8.89	10.35	11.10	10.55	8.82	9.48	8.99	10.80	17.10	16.10	21.20	20.45
Cincinnati**	.15	9.06	10.41	11.10	10.87	9.20	10.04	9.31	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	8.88[1]	10.03	11.29	10.66	9.07	9.90	9.11	11.40	17.21	16.21	21.31	20.56
Denver	.20	9.60	11.84	12.94	9.63	9.96	10.04	10.00	11.19				20.84
Detroit**	.15	9.15	10.61	11.45	10.92	9.19	10.04	9.30	11.16	17.38	16.38	21.48	20.73
Houston**		9.22	9.65	12.19[3]	10.78	8.95	8.86	8.63	13.10	17.50	16.55	21.55	20.85
Kansas City**	.15	9.36	11.02	11.50	11.02	9.25	9.95	9.46	11.72	17.17	15.87	21.87	21.12
Los Angeles**		9.59[1]	11.29	12.20	11.29	9.82	10.54	9.67	14.20	18.30	17.35	22.90	22.20
Memphis**	.15	9.99	10.20		11.39	10.27	10.48	10.07	12.89				
Milwaukee**	.15	9.03	10.49	11.24	10.69	8.96	9.70	9.13	11.04	17.24	16.24	21.24	20.49
New York	.10	9.46	10.23	11.45	11.56	9.61	10.30	9.84	13.35	17.50	16.50	21.60	20.85
Norfolk	.20	8.20			8.90	8.65	9.20	8.90	10.70				
Philadelphia**	.10	8.95	9.70	10.76	10.95	9.30	9.95	9.35	12.05	17.48	16.48	21.58	20.83
Pittsburgh**	.15	8.58	10.03	11.18	10.64	8.83	9.51	9.00	11.40	17.10	16.10	19.70	20.45
Portland**		10.20	12.05	12.35	12.20	10.35	10.80	10.20	16.65	18.50	17.45	20.75	20.25
San Francisco**	.10	10.27	11.79[2]	11.55	11.88	10.48	10.50	10.17	15.20	18.30	17.35	22.90	22.20
Seattle**		10.07	11.44	12.05	11.84	10.17	10.59	9.96	16.20	18.60	17.80	22.70	22.20
Spokane**	.15	10.07	11.44	12.05	11.84	10.17	10.59	9.96	16.35	17.75	17.95	21.58	22.35
St. Louis**	.15	8.99	10.75	11.48	10.65	8.93	9.60	8.97	11.43	17.48	16.48	21.58	20.83
St. Paul**	.15	8.99	9.74	10.99	11.16	8.83	9.33	9.27	11.64		16.69		21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. ** These cities are on net pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—½" x 1"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—⅝-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅝" to 2⅞"; cold drawn—15/16" to 2⅞" round; Hot-rolled 4140—⅝" to 2⅞" round, cold drawn—15/16" to 2⅞" round.

†† 13c zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier; [2] 14 ga. & lighter. [3] 10 ga. x 48 — 120.

(Effective June 27, 1960)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	73.00
Birmingham *R3*	62.00	62.50*	.....	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	71.50†
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Everett *M6*	67.50	68.00	68.50	.....	.....
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Lyles, Tenn. *T3*	.....	.....	.....	.....	73.00
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Rockwood *T3*	62.00	62.50	66.50	67.00	73.00
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
Sw. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	73.00†
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31-0.69 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1, I4*, (Globe Div.), $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add 75¢ per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 13 pct. Add $1.00 for each 0.50 pct manganese over 1.00 pct.

† Intermediate low phos.

FASTENERS

(Base discounts, f.o.b. mill, based on latest list prices)

Hex Screws and All Bolts Including Hex & Hex, Square Machine, Carriage, Lag, Plow, Step, and Elevator

(Discount for 1 container) — Pct

Plain finish—packaged and bulk	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

Nuts: Hexagon and Square, Hex, Heavy Hex, Thick Hex & Square

(Discount for 1 container) — Pct

Plain finish—packaged and bulk	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

Hexagon Head Cap Screws—UNC or UNF Thread—Bright & High Carbon

(Discount for 1 container)

Plain finish—packaged and bulk	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

(On all the above categories add 25 pct for less than container quantities. Minimum plating charge—$10.00 per item. Add 7½ pct for nuts assembled to bolts)

Machine Screws and Stove Bolts

(Packages—plain finish)

	Discount Screws	Bolts
Full Cartons	46	46

Machine Screws—bulk

¼ in. diam or smaller	25,000 pcs	50
5/16, ⅜ & ½ in diam	15,000 pcs	50

Machine Screw and Stove Bolt Nuts

(Packages—plain finish)

	Discount Hex	Square
Full Cartons	46	57
Bulk		
¼ in. diam or smaller	25,000 pcs	
5/16 or ⅜ in. diam	56	60
	15,000 pcs	
	56	60

Rivets

	Base per 100 lb
½ in. diam and larger	$12.85
	Pct Off List
7/16 in. and smaller	15

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1960 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

(Effective June 28, 1960)

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	28.00	31.50	29.00	32.75	33.25	34.50	51.25	41.50	48.25	—	22.25	—	22.50
Billets, forging	—	37.75	38.75	39.50	42.50	42.00	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	49.50	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25 31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	43.75	68.50	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	47.00	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7,* Wallingford, Conn., *U5* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13,* (25¢ per lb. higher); New Bedford, Mass., *R6* Gary, *U1,* (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5;* Reading, Pa., *C2;* Bridgeport, Conn., *N8* (down to and including ¼"*).

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forging billets: Ambridge, Pa., *B7;* Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* wensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Reading, Pa., *C2.*

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Ann'ld	Merch. Wire Galv.
	Col	Col	Col	Col	Col	¢/lb.	¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3***	173	190	...	...	190	9.00	9.675
Atlanta *A8***	175	193	...	214	199	9.10	9.85
Bartonville *K2***	175	193	183	214	199	9.10	9.85
Buffalo *W6*	...	...	...	...	...	9.00	9.55*
Chicago *N4*	173	191	177	212	197	9.00	9.75
Chicago *R3*	...	...	...	...	...	9.00	9.55
Cleveland *A6*	...	...	...	...	...	...	...
Cleveland *A5*	...	...	...	...	...	9.00	...
Crawf'dav. *M4***	175	193	...	214	199	9.10	9.85
Donora, Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	177	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	...	...	...	...	...	...
Houston *S2*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	184-1	197	...	219	203	9.10	9.775
Johnstown *B3***	173	190	177	...	196	9.00	9.675
Joliet, Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9**	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	...	...	...	...	...	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Palmer, Mass. *W6*	...	...	...	...	...	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	...	...	213	9.95	10.50
Rankin Pa. *A5*	173	187	...	...	193	9.00	9.55
So. Chicago *R3*	173	187	...	...	193	8.65	9.20
S. San Fran. *C6*	...	...	...	236	...	9.95	10.50
Sparrows Pt. *B3***	175	...	...	215	198	9.10	9.775
Struthers, O. *Y1**	...	...	...	...	...	8.65	9.20
Worcester *A5*	179	...	...	...	...	9.30	9.85
Williamsport *S5*	...	...	...	...	...	...	...

* Zinc less than .10¢. *** .10¢ zinc.
** 13-13.5¢ zinc. † Plus zinc extras.
‡ Wholesalers only.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

STANDARD T. & C.	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50								
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50								
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Fontana *K1*	*6.25		*2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50								
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.00¢ per lb.

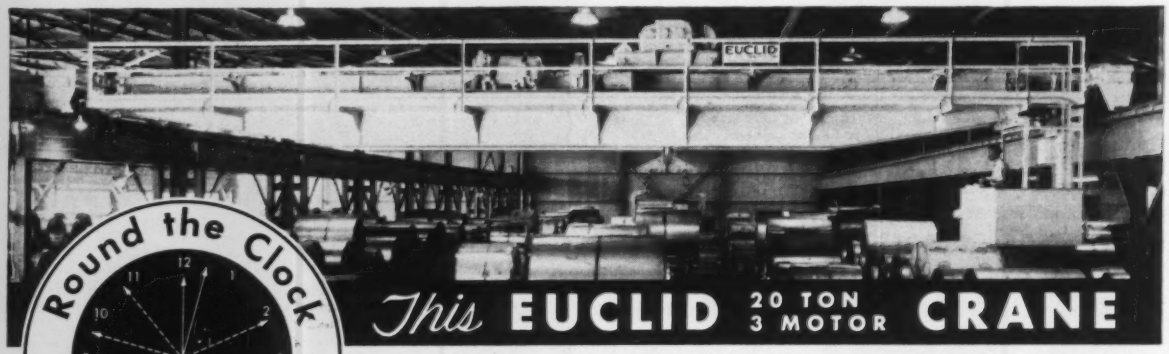
CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.5
Chicago	139.8
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

COKE

Furnace, beehive (f.o.b.)	Net-Ton
Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Chattanooga, Tenn.	30.80
Ironton, O., f.o.b.	30.50
Detroit, f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearny, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St. Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville, Is., Pa.	30.75



Expedites Steel Coil Handling IN and OUT of this

STEEL WAREHOUSE and PROCESSING PLANT

Yes, practically anytime of the day or night you'll find a man at the controls of this double girder, cab-operated, overhead traveling crane. With an impressive span of 60' it covers every square foot of one of the large storage bays at the Euclid, Ohio, plant of Chesterfield Steel Service Company. Ease of precision control and rapid acceleration and braking of all travel movements assure an unprecedented coil handling volume.

Built for Class 4 service, this crane is one of seven Euclid cranes in operation in this warehouse.

Euclid builds cranes in a wide range of spans and capacities for all purposes.

WRITE TODAY FOR THE CRANE CATALOG

THE EUCLID CRANE & HOIST CO. 1365 Chardon Road • Cleveland 17, Ohio

REQUEST A SURVEY of your present facilities by a QUALIFIED EUCLID REPRESENTATIVE

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.75	6.725	7.25			
Cleveland *R3*						15.35
So. Chicago *R3*				10.10		
Ensley *T2*	5.75	6.725				
Fairfield *T2*		6.725		10.10	6.875	
Gary *U1*	5.75				6.875	
Huntington, *C16*		6.725				
Ind. Harbor *I3*				10.10		
Johnstown *B3*		6.725				
Joliet *U1*			7.25			
Kansas City *S2*				10.10		15.35
Lackawanna *B3*	5.75	6.725	7.25		6.875	
Lebanon *B3*			7.25			15.35
Minnequa *C6*	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh *S14*						15.35
Pittsburgh *J3*				10.10		
Seattle *B2*					6.75	15.85
Steelton *B3*	5.75		7.25		6.875	
Struthers *Y1*				10.10		
Torrance *C7*					6.75	
Williamsport *S5*		6.725				
Youngstown *R3*				10.10		

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Anderson, Ind. *G4*	8.95	10.40	12.60	15.60	18.55
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. *W12*		10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70		
Detroit *D1*	9.05	10.50	12.70	15.70	
Detroit *D2*	9.05	10.50	12.70		
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	8.95	10.40	12.60	15.60	
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*			12.90	16.10	19.30
Indianapolis *R5*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	
New Britain, Conn. *S7*	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	
New Castle, Pa. *M8*	8.95	10.40	12.60	15.60	
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*		10.70	12.90	16.10	19.30
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *R5*	9.10	10.55	12.60	15.60	18.55

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper

Rolled elliptical, 18 in. or longer, 5000 lb lots 48.00

Electrodeposited, 5000 lb lots ... 39.50

Brass, 80-20, ball anodes, 2000 lb or more 53.00

Zinc, ball anodes, 2000 lb lots 20.50

(for elliptical add 1¢ per lb)

Nickel, 99 pct plus, rolled carbon, 5000 lb 1.0225

(Rolled depolarized add 3¢ per lb)

Cadmium, 5000 lb 1.40

Tin, ball anodes $1.05 per lb (approx.).

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum..... 65.90

Copper sulphate, 25.2 Cu min, 6000 to 12,000 lbs per cwt $13.75

Nickel sulfate, 5000 to 23,000 lbs... 29.00

Nickel chloride, freight allowed, 100 lb 45.00

Sodium cyanide, domestic, f.o.b. Chicago, 200 lb drums 25.00

Zinc cyanide, 100 lb 60.75

Potassium cyanide, 100 lb drum N. Y. 45.50

Chromic acid, flake type, 10,000 lb or more 30.44

METAL POWDERS

(Cents per lb, f.o.b. shipping point for ton lots or over, except as noted)

Iron Powders

Molding grade, domestic and foreign, 98 pct Fe, 100 mesh bags, freight allowed east of Miss. R. 11.50

Electrolytic Iron, melting stock, 99.87 pct Fe.... 28.75

Carbonyl Iron 88.00

Welding Grades 8.10

Cutting and Scarfing Grades 9.85

Hydrogen reduced, domestic 11.25

Copper Powders

Molding Grades

Electrolytic, domestic, f.o.b. shipping point. 15.00†

Atomized ..... 46.5 to 64.5

Reduced ..... 15.00†

Chemically Precipitated 15.00†

Brass, 5000-lb lots ..... 35.1 to 52.2

Bronze, 5000-lb lots ..... 53.1 to 56.7

Chromium, electrolytic 5.00

Lead ..... 7.50†

Manganese, electrolytic ... $1.00

Molybdenum .....$3.60 to $4.35

Nickel $1.15

Carbonyl Nickel, 20,000 lb lots $1.01

Nickel-Silver, 5000 lb lots.. 60.7 to 69.0

Silicon 70.00

Solder ..... 7.00†

Stainless Steel, 316 ..... $1.07

Stainless steel 304 ..... 89.00

Tin ..... 14.00†

Titanium, 99.25 + pct, per lb, f.o.b. $11.25

Tungsten .....$3.15 (nominal)

† Plus cost of metal.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field	.....	9.875	.....
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor	.....	12.475	.....
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30		
		Grain Oriented	
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Aliquippa (*J3*); Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*S1*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*L4, C4, A3, J2*) 10 pct	15 pct	20 pct	Sheet (*I2*) 20 pct
Stainless Type	302	.....	.....	.....	37.50
	304	28.80	31.55	34.30	40.00
	316	42.20	46.25	50.25	58.75
	321	34.50	37.75	41.05	47.25
	347	40.80	44.65	48.55	57.00
	405	24.60	26.90	29.25	.....
	410	22.70	24.85	27.00	.....
	430	23.45	25.65	27.90	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 44.20; 1 side, 36.80.

(Effective June 28, 1960)

REFRACTORIES

Fire Clay Brick

Carloads per 1000

Super duty, Mo., Pa., Md., Ky.... $185.00

High duty (except Salina, Pa., add $5.00) 140.00

Medium duty 125.00

Low duty (except Salina, Pa., add $2.00) 103.00

Ground fire clay, net ton, bulk... 22.50

Silica Brick

Mt. Union, Pa., Ensley, Ala. $158.00

Childs, Hays, Latrobe, Pa. 163.00

Chicago District 168.00

Western Utah 183.00

California 165.00

Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville 163.00-168.00

Silica cement, net ton, bulk, Latrobe 29.75

Silica cement, net ton, bulk, Chicago 26.75

Silica cement, net ton, bulk, Ensley, Ala. 27.75

Silica cement, net ton, bulk, Mt. Union 25.75

Silica cement, net ton, bulk, Utah and Calif. 39.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt.$109.00

Standard chemically bonded, Curtiner, Calif. 119.00

Burned, Balt. 103.00

Magnesite Brick

Standard, Baltimore $140.00

Chemically bonded, Baltimore 119.00

Grain Magnesite

St. ⅜ to ½ in. grains

Domestic, f.o.b. Baltimore in bulk. $73.00

Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk 46.00

in sacks 52.00-54.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in: Pa., W. Va., Ohio $16.75

Missouri Valley 15.60

Midwest 17.00

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	Length (In.)	Price	CARBON* Diam. (In.)	Length (In.)	Price
24	84	27.25	40	100,110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12.55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2½	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

BOILER TUBES

$ per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
Babcock & Wilcox..	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
National Tube.....	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
Pittsburgh Steel...	2	13	40.28	47.21	.....
	2½	12	54.23	63.57	.....
	3	12	62.62	73.40	.....
	3½	11	73.11	85.70	.....
	4	10	97.08	113.80	.....

ELECTRICAL POWER
EQUIPMENT IN STOCK

DC MOTORS

Qu.	H.P.	Make	Type	Volts	RPM
1	3900	New G.E.	Enc. S.V.	475	320
1	3000	New Whse.	Enc. F.V.	525	600
2	2700	G.E.	Enc. S.V.	415	280
1	2250	New G.E.	Enc. S.V.	600	200/300
1	2200	G.E.	Enc. S.V.	600	400/500
3	2000	G.E.	Enc. S.V.	350	230/350
2	1750	G.E.	Enc. S.V.	250	175/350
2	1500	Whse.		600	300/700
4	1500	New Whse.	Enc. F.V.	525	600
2	1400	G.E.	MCF	250	165/300
1	1300	G.E.	MCF-12	300	200/400
1	1200	G.E.	MCF	600	450/600
1	1000	Whse.		500	800/2000
4	1000	GM	DS	600	600/900
2	900	G.E.	MCF	250	180/360
1	850	G.E.	MCF	250	85/170
2	800	G.E.	MCF	250	400/750
2	800	G.E.	MCF	250	780
2	750	G.E.	MCF	600	450/900
1	750	G.E.	M.F.	600	120/360
2	645	S.S.	V.G.	300	1000
4	600	Whse.		250	275/550
1	500	G.E.	MPC-10	250	188/400
2	450	Whse.		550	415
4	400	G.M.	DS	250	300/900
2	400	G.E.	CY-275	300	1000/1500
1	300	Cr.Wh.	H-102 B.B.	230	1200
1	150	Cr.Wh.	CMC-65H	230	1150
1	150	G.E.B.B.	CD	600	250/750
1	150	G.E.B.B.	CDP-125	230	1750
1	125	Cont. B.B.		230	1750
1	100	G.E.	CDP-115	230	1750
1	80	Whse.	SK-123.9	240	2000-4500
1	75	G.E.B.B.	CD-1235-D.P.	600	850

SWITCH GEAR

Large Stock Oil & Air C/BC can furnish in NEMA 1 Enc. or Open Magnetic or Manual Operation. What are your needs & I. C. Requirements.

MG SETS—3 Ph. 60 CY.

Qu.	K.W.	Make	RPM	DC Volts	AC Volts
1	4800	G.E.	450	300	2300/4600
1	2400	G.E.	450	300	2300/4600
1	2000	G.E.	514	600	2300/4600
2	1750/2100	G.E.	514	250/300	2300/4600
1	1750	G.E.	514	600	2300/4600
1	1500	G.E.	720	600	6600/13200
1	1500	Cr.Wh. 4 unit	720	100	2300
1	1000	G.E.	900	600	2300/4000
1	1000	G.E.	720	250	2300/4150
1	1000	G.E.	900	260	4000/6900
1	500	G.E.	900	125/250	440
1	500	G.E.	900	250	2300/4600
1	500 (New)	G.E.	1200	300	2300
1	350	G.E.	900	125	440/2300/4160
1	300	G.E.	1200	250	2300/4000
1	300	G.E.	1200	250	440/2300
1	250	G.E.	900	250	440/2300
1	240	Whse.	900	125	220/440
1	200	Whse.	1200	550	2200
1	200	El. Mhy.	1200	250	2300/4600
1	150	G.E.	1200	275	2300
1	150	Whse.	1200	275	2300
1	150	G.E.	1200	125	440
	140	Cr.Wh.	690	125/250	2300
1	100	G.E.	1170	250	220/440
2	100	Cr.Wh.	S1160	525	220/550
1	100	G.E.	1200	250	2400/4100
2	75	Whse.	1200	125	440

TRANSFORMERS

Qu.	KVA	Make	Type	Ph.	Voltages
3	3333	Whse.	OISC	1	13800 x 2300
1	3000	A.C.	OISC	3	34500 x 2300
3	1000	G.E.	OA/FA	1	13800 x 230/460
3	833	A.C.	OISC	1	4800/2400 x 480
3	833	A.C.	OISC	1	10175/13475 x 2300/4000
2	750	G.E.	Pyranol	1	4800 x 85/55-255/165
3	500	Mal.	C	1	6600/11430Yx480
3	500	Kuhl	OISC	1	13200 x 6600
3	150	G.E.	OISC	1	33000x2300/4000Y
3	167	G.E.	HS	1	13800 x 240/480
3	100	G.E.	HS	1	4800/8320Y x 120/240

CRANE & MILL MOTORS
230 V. D. C.

Qu.	H.P.	Make	RPM	Type
12	12/14	Whse.	700/600	MCA-30. Series
1	20	Whse.	975	K-5 Series
2	23	G.E.	650	MDS-408 Shunt
1	35	Whse.	480	CK-9 Comp. S.B.
1	35	Whse.	480	CK-9 Sh. R.B.
1	45	Whse.	600	CK-9 Come. S.B.
3	50	G.E.	650	COM-1830 Comp.
2	50	Whse.	525	CK-9 Shunt R.B.
2	50	Whse.	600	CK-.9 Comp. R.B.
1	50	G.E.	525	COM-1830AEB.B.
1	50	Cr.Wh.	550	SW-50 Comp.
9	125/165	G.E.	625/575	CO-1832 Ser.
1	100	G.E.	475	CO-1832 S.B.
6	100-140	Whse.	500/415	MC-90 R.B.

Above only partial listing of our available stock.

RE-NU-BILT By

BELYEA COMPANY, INC.

47 Howell St. Jersey City 6, N. J.

Tel. OLdfield 3-3334

Chicago Sales Move Up Slightly

Used machine dealers in the Chicago area report a slight increase in business. But they still are skeptical about the future.

■ The mild upswing, reported in the Chicago area in mid-May, continues. When first spotted, only a few firms were able to report sales gains. This month, the gains continue to be slight, but appear to be spreading to cover an increasing numbers of tool sellers and rebuilders.

Another heartening step forward: As of mid-May, the improvement was confined largely to heavy production equipment sold "reconditioned," and to sheet metal working equipment. A spring upturn in sheet metal working tools is a seasonal factor, as the mild surge of activity in that sector didn't arouse much hope.

More Gains—As of this week, however, a greater percentage of shops are reporting sales gains in heavy equipment. And this time they are backed up by similar gains in the "rebuilt" machine tool field. Rebuilders are still running a scant five day week, but orders are up and actual number of hours per worker during the five day week have advanced to a more economic figure.

Along with sales gains to local buyers of reconditioned and rebuilt equipment, have come increases in the inquiry rate from Coastal areas, particularly the West. This hasn't produced any rash of sales but the mere fact that the West Coast, reported to be in trouble only a month ago, is out and shopping is regarded as an indication of a general, if mild, improvement.

Watchful Eye—Tool sellers aren't going overboard on future business prospects as a result of a slight 3-day upswing in business volume. They are carefully pointing out that: Sheet metal working tools always advance during the spring months and continue to show seasonal strength well into summer, and purchasing agents often lump their rebuild orders and put the machines out for rebuilding just prior to their own plant vacation shutdowns. With these two negative elements in the picture, just how good is the outlook?

It all points to a third quarter increase from here on, in the opinion of some tool men. Money is looser, interest rates aren't as tough. These two factors always help used tool business.

Prices Firm—Again, tool prices are holding firm in other areas as well as the Midwest. This price firming has, in the past, usually been followed by an upswing in business levels. The answer to the question, "How good is the outlook?" seems to be that it's a lot better than it was 30 days ago. And each week makes it look somewhat more rosy.

Another point worth noting: Dealers were reported building inventory at a slow rate during May. This same group is again making mild boosts in its floor stocks of tools, and has been joined by other firms that weren't particularly interested in sinking more money in inventory as recently as 30 days ago.

Briefly, everything is beginning to confirm the May business increase predicted in this column last month. What's more, it now appears that June sales will equal or exceed the May figure.

RAILWAY EQUIPMENT

USED and RECONDITIONED

RAILWAY CARS and REPAIR PARTS

FLAT CARS

4—50-Ton Capacity, 43' long
Steel Underframe

30—Used, All-Steel
30-Cubic Yard, 50-Ton Capacity
MAGOR AIR DUMP CARS
Excellent Condition—Immediate Delivery

DIESEL-ELECTRIC LOCOMOTIVES

1, G. E. 25-Ton, 150 H.P., Std. Ga.
3, G. E. 44-Ton, 400 H.P., Std. Ga.
1, G. E. 80-Ton, 500 H.P., Std. Ga.
1, 125-Ton RAILROAD TRACK SCALE

IRON & STEEL PRODUCTS, INC.

13496 S. Brainard Ave
Chicago 33, Ill.
Ph: Mitchell 6-1212

51-B E. 42nd St.
New York 17, N. Y.
Ph: YUkon 6-4766

UNIVERSAL Machinery & Equipment Co.

AMERICA'S LARGEST STOCK OF FOUNDRY EQUIPMENT

ARC MELTING FURNACES

1—250# LECTROMELT—185 KVA
1—500# LECTROMELT—200 KVA
1—1000# SWINDELL
1—2000# SWINDELL—1000 KVA
1—3000# HEROULT, Door Charge—800 KVA
1—11' LECTROMELT TOP CHARGE
1—12' SWINDELL Top Charge—5000 KVA
DETROIT FURNACES—10 lb. to 3000 lb. Cap.

INDUCTION FURNACES

1—20 KW AJAX Spark Gap 17# Melting
1—30 KW VACUUM Melting, Complete—Like New
1—100 KW AJAX Melting Installation—Late

100 KW AJAX Induction
Vacuum Melting Unit—NEW

HEAT TREAT FURNACES

1—4'x4'x10' Gas Fired Box
1—7' G. E. Rotary Hearth Electric, 1900°F.
1—36" dia. x 36" deep Electric Recirculating
1—46" wide Roller Hearth, 50' long with atmosphere generator
1—210 KW LINDBERG conveyor type, 1400°F.

CLEANING EQUIPMENT AND GRINDERS

1—20x27 WHEELABRATOR *dust*
1—27x36 WHEELABRATOR w/loader *Collectors*
1—36x42 WHEELABRATOR w/loader *available*
1—48x42 WHEELABRATOR w/loader *for all*
1—72" WHEELABRATOR Swing Table *machines*
1—WHEELABRATOR No. 1-A Multi-Table
1—48" WHEELABRATOR Swing Table
1—6' LK PANGBORN Table-room
1—PANGBORN Pipe Cleaner, 2" to 14" O.D.
1—SAFETY 10 H. Swing Grinder
1—WHITING 26"x54" tumbling barrel

. . . SPECIAL . . .

4-HI 66" wide **HOT MILL**, 3000 Hp motor and drive, power screwdowns, etc., complete
15 Ton Double Leg A.C. Gantry Crane

Model 43 LIQUAMATTE wet blasting cabinet. Brand New. Ideal for finishing and cleaning tools, dies, molds, etc. at 50% SAVINGS.

1630 NORTH NINTH ST. READING, PA PHONE FRANKLIN 3-5103

Keep 'em rolling . . . not rusting

FOR SALE

New—Used—Reconditioned railroad freight cars • car parts • locomotives • tank cars • steel storage tanks.

MARSHALL RAILWAY EQUIPMENT CORPORATION

328 Connell Building, Scranton 3, Pennsylvania
Diamond 3-1117 Cable MARAILQUIP

NEW G.E. A.C. MOTORS

FOR HYDRAULIC PUMPS OR HYDRAULICALLY DRIVEN DECK MACHINERY OR CRANES

New, as removed from U. S. Naval vessel Hawaii.

ALL A.C. 440/3/60

10 HP Continuous—40 HP intermittent ½ hour. High slip, high torque, induction, type KR. 2 available.
10 HP Continuous—40 HP intermittent ½ hour. 1040/520 RPM. 1 available.
(The above two motors have magnetic brakes.)
15 HP Continuous—60 HP intermittent ½ hour. 1770 RPM—type KF.
20 HP Continuous—1770 RPM—type KF.
40 HP Continuous—wound rotor—440/3/60—635 RPM. Type M. 1 available.
18¾ HP Continuous—75 HP intermittent ½ hour. 1775 RPM, type KF. 2 available.

THE BOSTON METALS CO.

313 E. Baltimore St. • Baltimore 2, Md.
ELGIN 5-5050 - LEXINGTON 9-1900

COMPRESSORS

No better values at any price

100 CFM	100 psi	6 x 7 Ing. or Worth.
138 CFM	100 psi	7 x 7 Ing.—CPT—Worth.
142 CFM	125 psi	Ingersoll Rand Type 40-Jaeger
183 CFM	150 psi	7 x 7 Joy WG9
191 CFM	300 psi	9-4½ x 9 ES-2
194 CFM	125 psi	7-7-6 x 5 Worth. M40
234 CFM	100 psi	9 x 9 Ing.—Worth. Chic Penn
290 CFM	75 psi	10 x 9 Ing. ES-1
364 CFM	100 psi	10 x 9 Joy WG9
465 CFM	100 psi	12 x 11 IR—Amer.
502 CFM	125 psi	12 x 13 Ing. Rand.
585 CFM	100 psi	15-9¼ x 12 Ing.
660 CFM	125 psi	11½ x 7 x 7 Joy WN 102
676 CFM	100 psi	15-9¼ x 12 Ing. XRB
686 CFM	100 psi	14 x 13 IR—CPT
827 CFM	125 psi	17/10½ x 14—IR—XRB
1721 CFM	100 psi	23-14x16 Ing. PRE-2
	285 hp.	GE-TS Syn. Motor 3/60/2300 See it running
2506 CFM	50 psi	19/19 x 14 Penn—DE—1
	300 hp.	Em syn. Motor 3/60/2300
Portable Gas-diesel 60"-600'		

AMERICAN AIR COMPRESSOR CORP.

DELL AND IRON STREETS
NORTH BERGEN, N. J.
Telephone UNion 5-4848

REBUILT—GUARANTEED ELECTRICAL EQUIPMENT

MOTOR GENERATOR SETS

TYPICAL FOR MILL & REEL DRIVES

(2)—3500/3000-KW Al.Chal. 5-unit Sets, (2) 1750-KW, Gen. 350/300—700/600-V.D.C., (1) 5000-HP Syn. Motor 13800/6900/4160-V., 3 ph., 60 cy., with exciters.
(1)—1325-KW Whse. 2-unit Set, Gen. 600-V.D.C., with 2250-HP Syn. Motor 2300-V., 3 ph., 60 cy.
(1)—1520-KW 3-unit Set, (2) 760-KW Gen., 600-V.D.C., (1) 2250-HP Syn. Motor, 2300-V., 3 ph., 60 cy.
(1)—200-KW General Electric 3-unit Set, (2) 100-KW Gen. 250-V.D.C., with 300 HP Syn. Motor, 2300-V.D.C., 3 ph., 60 cy.

We can supply various Motors with these Sets, together with exciters and controls as a COMPLETE PACKAGE.

DIRECT CURRENT MOTORS
Adjustable and Constant Speed
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1—N-*	2200	Whse.	600	92/132
2—N-*	2000	G.E.	350	230/350
2—N-*	1750	G.E.	600	200/300
1— *	1500	Al.Chal.	600	120/240
3—N-*	1500	Whse.	600	300/700
2—N-*	1400	G.E.	250	165/300
6—N-*	750	Whse.	250	300/700
1	750	Whse.	250	200/400
2— *	650	S.&S.	300	1000/1350
2	600	Al.Chal.	600	300/600
1	600	Whse.	250	110/220
2	300	Whse.	230	300/600
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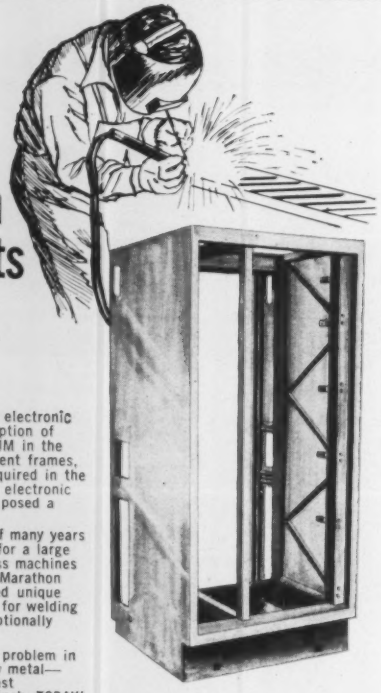

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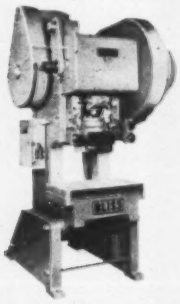

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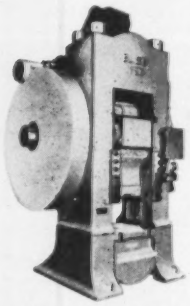

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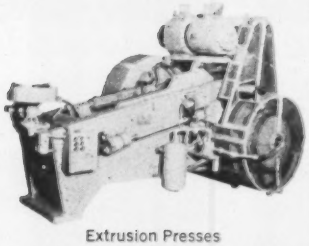
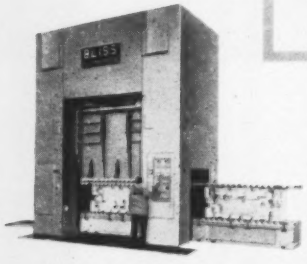


Extrusion Presses

Eccentric Presses



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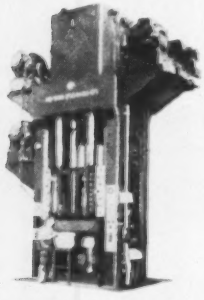

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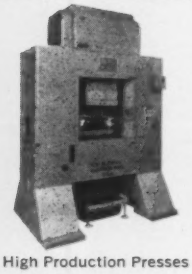
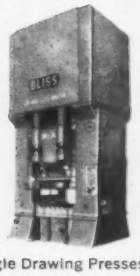


High Production Presses



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